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WORLD'S PREMIER R/C MODELING MAGAZINE

NEWS

48120

April 1997

PRODUCT GUIDE

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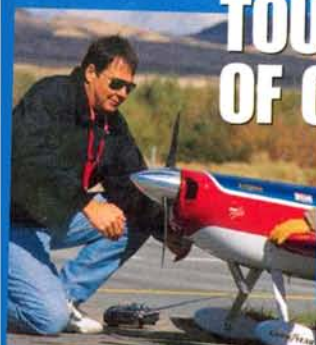
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ON THIS PAGE: top—Tom Polapink built this beautiful Fokker D-VII from a highly modified Sterling kit for the Rhinebeck WW I Jamboree; center—something a bit unusual: Thayer Syme's Bee 314, which is featured in "Readers' Gallery"; bottom: from Mr. Small Steps himself, Randy Randolph, this neat little sport-scale Jodel Bebe just might be the ticket for your next build-it-quick project. We have the plans.

ON THE COVER: main photo—the Carl Goldberg Models Bucker Jungmann is a high-performance aerobat. See our "Field & Bench Review" on page 70. Inset left: Bill Cunningham, 5th-place winner at the 13th International Tournament of Champions, tends to his Giles G-200. Inset right: Vern Nulk's scratch-built Albatros DVa was one of many beautiful WW I biplanes seen at the 30th Annual Rhinebeck Jamboree.

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EDITORIAL

by LARRY MARSHALL

IF IT FLIES, DO IT!

Are you a pattern flyer ... a scale modeler ... a slope head ... a sport flyer ... or are you a thermal sailplane pilot? Some flyers are pattern-scale-slope-sport-sailplane pilots, and in their spare time, they may fly old-timers. While this sort of do-it-all modeler used to be very common, in recent years, it seems that more and more model aviation enthusiasts have become one type of modeler, and there they stay, ignoring all other forms of model aviation. What's sad is that once these modelers make this decision, many spend a good portion of their time and energy trying to convince others that their personal choice is the "way to go." In fact, this is becoming a hobby of its own for some who hang out in Internet conferences.

How come? Why is it, for instance, that flying large models afflicts one with the belief that someone who flies small ones is ill-informed? No, it doesn't have to do with the adage that "bigger flies better"—true as that statement may be. The reason I know is because those who fly small models think people who fly giants are equally misguided. Small-plane flyers know that "small is easier to build and transport," and thus they "provide more fun." And if you don't believe me, just ask them!

But, if the truth be known, the folks who have the most fun in this hobby are those who believe that if it flies, they want to be involved. Let's look at an example of a do-it-all modeler/flyer, Nick Ziroli Sr. Nick recently won a Scale Masters qualifier by flying his 114-inch-wingspan P-38, which is powered by a couple of Quadra 45s. He's well-known as one of the best designers of giant-scale aircraft on the planet. But this is the same Nick Ziroli who designed, built and flew a 34-inch-wingspan, .049-powered

Sukhoi (*Model Airplane News*, January 1994). Nick's also the guy who showed up at a KRC Electric Fly-In to show off his electric-powered, ducted-fan He-162 Salamander (*Model Airplane News*, May 1996). Nick is also a regular at Rhinebeck, generally flying a sport-scale Taube and trying to burst balloons, get a bomb on target and doing his best to nail the landing in the Jamboree Mission event. Is he having fun or what?

I guess the point of this is to suggest that specializing in one form of model



Nick Ziroli with his new Ringmaster design, which is based on Harry Williamson's 1951 CL Ringmaster (*Model Airplane News*, October 1951).

aviation is great; it gives one an opportunity to excel in some particular aspect of the hobby. But it's also limiting: it's just plain fun to try something else once in a while! As you plan your upcoming flying season, think about giving some other aspect of our great hobby a try. If you fly large airplanes, build a small one. You might just find that the park down the street will let you get in a flight or two after work. If you build it as an electric model, all you'll have to take with you is the transmitter and a few charged battery packs.

If you fly sport planes, build a scale model. Every modeler should experience the thrill of flying a plane for which he knows the history of its full-size counterpart. You don't have to count rivets to experience this thrill; just read a bit about a plane that interests you and build a sport-scale kit of it.

If you've never tried slope soaring, head to a hill somewhere and throw something with wings over the edge. Many slope planes are really quick builds, but just about anything goes here. There's slope soaring going on in Kansas, so you don't need a cliff overlooking an ocean. Plenty of slope soaring occurs at gravel pits, landfills, abandoned highway overpasses and anywhere there's a hill with wind blowing into it. And slope flyers are now making sport-scale airplanes that bounce! Now there's some technology worth investigating.

So, broaden your view of this hobby as you choose your wings, and fly. You won't regret it.

RHINEBECK, TOC AND JODELS

To tempt you a bit with some of the different aspects of model aviation, we've got quite a lineup this month. Rhinebeck's R/C Jamboree is a very special event that mixes full-scale aviation with modeling. It's a great entry point into aviation history and scale modeling. There's also the unique, fun WW I mission event that's flown there every year.

Or maybe a bit of scale aerobatics will charge your interest level. The Tournament of Champions is the premier scale aerobatics event in North America, where the best aerobatics flyers in the world compete with very sophisticated giant-scale aerobatic planes. TOC is for the best of the best, but there are more and more IMAC meets popping up around the country, and there's fun to be had by anyone willing to do loop and roll components in a sequence. A large array of Extra, Laser and CAP kits are available for this sort of flying.

Maybe your cup of tea is a small, easy-to-build aircraft that can be flown in just about any small field. If so, Randy Randolph's little Jodel might be what you need on your building board. This issue, we present plans for Randy's airplane, which should be a quick build. Have some fun and try one. ✦

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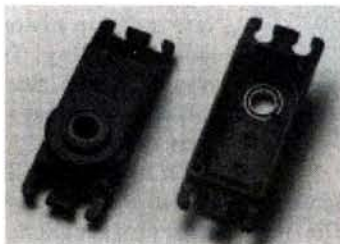


RPM: 2000 - 12,000
Shaft Size: 3/8"x24
Weight: 26.4oz

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AIRWAVES

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Airwaves," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606; email: man@airage.com. Letters may be edited for clarity and brevity. We regret that, owing to the tremendous number of letters we receive, we can not respond to every one.

PARALLEL VS. SERIES

I was looking for an electric twin model and was excited to see the article on Jim Ryan's P-38. The article left me confused on one issue, and I wonder whether you or someone there could enlighten me. Jim states that a fellow in Germany recommended two 7.2V Speed 400s running in parallel on 10 cells. Ten cells would produce 12 volts and, if run in parallel, each motor would receive the 12 volts. That seems high for these motors. Jim goes on to say that he switched to 16 cells, which would give around 19 volts. Again, if run in parallel, the motors would each receive the 19 volts. If run in series, they would still be getting a lot of volts. So, my question is, "How did he wire the motors—in series or parallel?" Hope you can shed some light on this before I order the plans.

I enjoy your magazine.

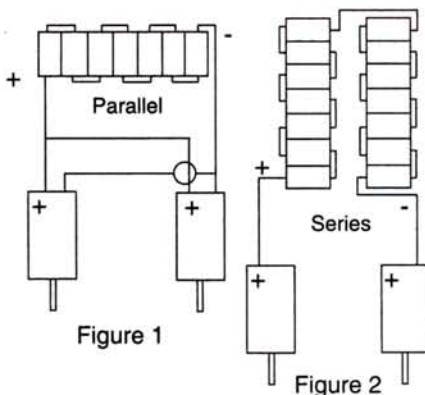
RICHARD BAUER
Via email

To get to the bottom of Jim's comments requires that we talk about a couple of issues. First, most people have found that if you keep Speed 400 motors below 10 amps, they will do well. Optimal efficiency is a bit below that. Second, most people have found that success with Speed 400s generally requires using more cells than the nominal voltage rating provided by Graupner would suggest. In practice, most guys will fly 6 or 7 cells on a 6V motor and 7 to 10 cells on the 7.2V motor, adjusting the prop size so that the current draw will be around 10 amps under static, full-throttle conditions. This is the basis for the recommendation from Jim's German buddy as 10 cells, in parallel, will provide about 10 volts, not 12 volts when placed under load. With the proper prop, the combination provides good power and service.

I think you missed something in Jim's discussion about his use of 16 cells, however. He states clearly on page 55 (*Model Airplane News*, January '97) that "I rewired the harness to run 16, 600AE cells in series." Rather than the 19 volts you calculate, the total voltage under load will be around 16 volts, and each motor will see half of that, or 8 volts, with the motors in series. As Jim states a bit later in his arti-

cle, "I chose Graupner 6x4 props, which cause the motors to draw about 9 amps at full throttle."

For those a bit less familiar with the concepts of series and parallel wiring, here's a table that describes the differences and a couple of graphics that show the wiring differences. LM



	Current draw	Motor voltage
Parallel	...Twice a single motor	... Same as battery voltage
Series	...Same as a single motor	... 1/2 battery voltage

ROBOTICS COMPETITION UPDATE

Since *Model Airplane News* just ran my article on the 1996 International Aerial Robotics Competition, I thought the readership might like an update on the upcoming 1997 competition. Fourteen teams met the application deadline for the 1997 collegiate event, half of which are returning from the 1996 event with improved aerial robots while the other half are new challengers:

- Carnegie Mellon University (USA)
- DeVry-Calgary (Canada)
- Eidgenossische Technische Hochschule* (Switzerland)
- Georgia Institute of Technology* (USA)
- Mass. Institute of Technology* (USA)
- Oakland University* (USA)
- Purdue University* (USA)
- Rose-Hulman Institute* (USA)
- Simon Fraser University (Canada)
- Stanford University (USA)
- University of California-San Diego (USA)
- University of Central Florida* (USA)
- University of Southern California (USA)
- University of Texas-Arlington* (USA)

*Teams returning from last year.

To stay current with the latest competition updates on a daily basis, be sure to check out the official International Aerial Robotics Competition website at: <http://avdil.gtri.gatech.edu/AUVS/IARCLaunchPoint.html>.

If you are really interested in seeing a major aspect of the future of flight taking form today, you may want to actually attend the 1997 competition on July 14, 1997. It is free and open to the public. Watch the Web page for specific times and locations.

ROBERT C. MICHELSON
Smyrna, GA

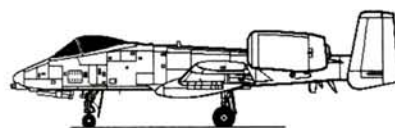
Thanks for the update, Rob.

LM



COLOR CROSS-REFERENCE GUIDE

In the February 1997 "Airwaves," I made reference to a book titled, "The IPMS Color Cross-Reference Guide" by David Klaus. Several people have asked for information on the book, so I thought I'd provide info on how to get a copy. You can buy it with or without a complete set of FS standards color chips. Contact: Meteor Productions, P.O. Box 3956, Merrifield, VA 22116. Book only—\$21.95 plus \$4.25 postage; book and FS595a color chips—\$58.95 plus \$5 postage. LM





AirSCOOP

by CHRIS CHIANELLI

New products or people behind the scenes; my sources have been put on alert to get the scoop! In this column, you'll find new things that will, at times, cause consternation, and telepathic insults will probably be launched in my general direction! But who cares? It's you, the reader, who matters most! I spy for those who fly!



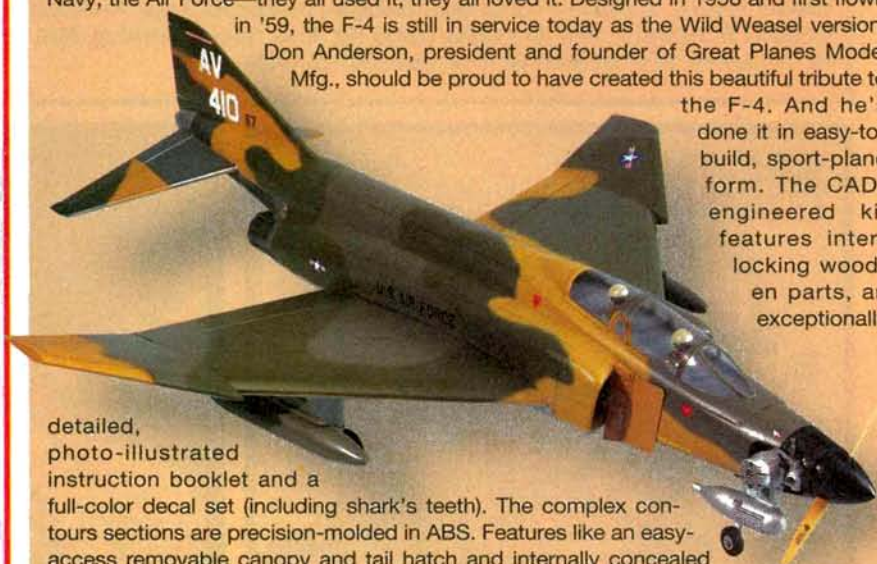
STAUDACHER MINIMAC

The world's latest aerobatic machine, the Staudacher S-300, which some predict will follow in the footsteps of the Pitts, Extra and Sukhoi, is now available from Ace in a midsize version. Excellent for intermediate to advanced pilots, the Ace S-300 is legal for the new MINIMAC aerobatic class now recognized by IMAC and also proposed as an AMA event category for '98. This balsa-and-ply semi-scale kit features many formed parts, aluminum landing gear and complete hardware package. Specifications: wingspan—56 inches; area—600 square inches; weight—5 to 6 pounds; engine—.40 to .50 2-stroke or .40 to .65 4-stroke. Contact Ace R/C Inc., 116 W. 19th St., P.O. Box 511C, Higginsville, MO 64037; (800) 322-7121.

F-4/.60

The MiG-Killer, the Rhino, the Phantom—by any name, the McDonnell Douglas F-4 Phantom II shines on as one thing: a legend in aviation history. The Marines, the Navy, the Air Force—they all used it; they all loved it. Designed in 1958 and first flown in '59, the F-4 is still in service today as the Wild Weasel version. Don Anderson, president and founder of Great Planes Model Mfg., should be proud to have created this beautiful tribute to

the F-4. And he's done it in easy-to-build, sport-plane form. The CAD-engineered kit features interlocking wooden parts, an exceptionally



detailed, photo-illustrated instruction booklet and a full-color decal set (including shark's teeth). The complex contours sections are precision-molded in ABS. Features like an easy-access removable canopy and tail hatch and internally concealed control linkages for aerodynamic cleanliness are examples of the forethought that has gone into designing this F-4. I truly look forward to seeing this one at the field and in the air. Specifications: wingspan—50 inches; wing area—880 square inches; weight—8.5 to 9.5 pounds; wing loading—22 to 25 ounces per square foot; length—64.5 inches; engine requirements—.61 to .75ci. For more information, contact Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948. Tell them you saw it in "Air Scoop"!



Without a doubt, one of the leading causes of fatigue at the field is back pain, which is only exacerbated or, in some cases, even caused by making field adjustments or repairs while squatting, kneeling or hunching over a model that's sitting on the often wet ground. And we can forget using the club picnic table. It's constantly occupied by that guy with the Grumman

Midwest's Aero-Stand More Energy—More Space



Wildcat. He's always tinkering with that scratch-built retractable landing gear that he's always bragging about. Midwest's new Aero-Stand is not only one of the most useful tools you'll ever own, but I bet you'll notice that you'll have more energy during those flying sessions; I'm very serious about this. And you will find it very useful in the shop as well. No more giant-scale fuselages monopolizing your workbench. We're talking instant, new-found workspace in your shop. The Aero-Stand, which can hold up to 55 pounds, features a three-position adjustable cradle (4, 7 and 11 inches), corrosion-resistant, steel-tube construction with a white-powder finish and a fold-down design for transportation. I really think this is one product you should consider. Between field and shop applications, it will be in constant use. Can't say that about too many products. Gee—can you tell I really like this one? Contact Midwest Products Co. Inc., 400 S. Indiana St., P.O. Box 564, Hobart, IN 46342; (800) 348-3497; fax (219) 947-2347.



Multi-Mission Fun

The BTE Flyin' King is a versatile sport/utility design with an 80.5-inch wingspan, a wing loading of only 17 to 18 ounces per square foot and operational flaps as standard equipment. With its high-lift wing configuration, the Flyin' King has been pressed into service for in-flight

photography (video), glider and banner towing, float-flying, long-distance flying and weight-lifting. It has even been reported that the King has flown a number of "candy-drop" missions—sounds like a sweet assignment to be sure. Sport and fun-flying are, of course, also intended roles. The kit features accurately machined parts, top-quality wood and hardware, rolled plans and detailed instructions. Tricycle gear is standard; however, conversion to conventional (tail-dragger) configuration is easy. Recommended engines are .60 to .75 2-stroke or .70 to .91 4-stroke. Contact BTE (Bruce Tharpe Engineering), 8622 Evans Creek Rd., Roque River, OR 97537; (541) 582-1708; orders (800) 557-4470.



MORRIS .45



Morris Hobbies is very proud to introduce the Morris .45—the first engine in its line. With features such as double ball bearings, true ABC piston/sleeve technology, two-needle carburetor and a serious warranty that includes 80-percent crash protection, this engine seems to have what the sport modeler wants and needs. Oh, yes; the new engine should also be of very high quality throughout; it's manufactured for Morris Hobbies by Ross! The Italian reputation with 2-stroke glow engines in terms of performance and durability is legendary. Reports have it that the Morris .45 will turn a 10x5 prop at 16,000rpm. It's also very user-friendly, featuring good starting characteristics and a linear power curve. No wonder Walter Morris is proud to put his own name on the crankcase; I would be. For more information, contact Morris Hobbies, 4200 Leghorn Dr., Louisville, KY 40218; (800) 826-6054.



Spool Up with the Bandit

BVM's new, all-composite, sport jet called the Bandit is now ready and waiting in both turbine and ducted-fan versions. The "T" version is specially designed for the JPX turbine with its BVM By-Pass System, large flaps and speed brake. The "V" version, which is simpler and less expensive, uses the BVM .91 and Viojett fan. Both versions incorporate a computer-optimized airfoil, making the Bandit the easiest jet to land in the BVM line. With the latest techniques in computer design and tooling coupled with the CAD drawings and computer-enhanced photo-instruction manual, the Bandit not only represents the latest in jet-model technology, but is also a pleasure to build. Owing to its modular assembly, the finished model can be broken down for easy transportation, and it even fits into its original shipping box. The Bandit is 72 inches long and has a 64-inch wingspan with 832 square inches of area. Swept or conventional fin and wingtip tanks are some of the available options. Contact BVM, 170 State Road 419, Winter Springs, FL 32708; (407) 327-6333; fax (407) 327-5020; website: www.bvmjets.com.



Cell Technology Progresses

Sanyo's 2000mAh cell is here! It's true; Sanyo has developed a super cell just for the R/C market. Trinity reports that because of more stringent manufacturing technology, the 2000mAh cell offers more capacity, voltage output and durability, and it also has more consistently matched specs from cell to cell, giving packs made from them lots of punch. Contact Trinity Products, 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.



tor with total performance pack. All three versions have in-flight adjustable mixture. Contact Sig Mfg. Co., P.O. Box 520, 401-7 S. Front St., Montezuma, IA 50171-0520; (515) 623-5154, fax (515) 623-3922.

Texan "500"

All Texans aren't big. Wing Mfg. introduces the legendary AT-6 in a multipurpose .25 to .40 size. According to Wing, with a .25, it's a great advanced trainer (like the full-scale) with "groovy" flight characteristics. Bolt on a .40, and it's pylon-racing time. With Wing's box-frame fuselage and foam-core wing, the AT-6

builds fast and is rugged enough to take the punishment of rough field conditions. The kit includes a formed fuselage top, cowl and clear canopy (plus other formed parts), all the necessary balsa with laser-cut formers and bulkheads, precision-cut foam-

core wings, a full hardware pack, a motor mount and decal sheets with lots of numbers and racing logos. Specifications: wingspan—55 inches; wing area—500 square inches; stab area—82 square inches; dry weight—5 pounds; semisym-



metrical airfoil. Contact Wing Mfg., 306 E. Simmons, Galesburg, IL 61401; (309) 342-3009; fax (309) 342-3014.

ROSSI 1.05—ADD-ON AFTERBURNER!

According to Sig Mfg., the new Rossi 1.05 fan engine, which boasts 6.15hp at 24,000rpm, can give a marginal .90-powered, ducted-fan jet sparkling vertical performance. Apparently, Rossi has spared no expense with the 1.05. Features include a one-piece investment-cast case with elongated cooling fins and extra bracing (to eliminate power-robbing crankshaft "whip" at high rpm), true ABC piston/sleeve technology with unique Ugo Rossi "mustache" exhaust porting, a bar-stock rod bushed at both ends, a Bi-Turbo glow plug with tapered seat for a better seal (with a conical, not cylindrical, element for 200 to 500rpm gain over standard plugs) and the finest Swiss-made bearings with phenolic retainers that are rated at 30,000rpm. Available in three different versions: pusher, tractor and tractor

Bella-V Version

The Bella-V is the new aileron version of the ready-to-fly Bella-U, which is a hot performer on a Speed 500 Race motor. Like the Bella-U, you can have the "V" version ready for flight in four hours after you receive it. The one-piece wing is ready-built and covered and has aileron servo cutouts for miniservos. The fuselage is fiber-



glass, and the wing stab and rudder are already covered. This version of Bella not only catches thermals, but it's also a great hot-dogging aerobatic sailplane. Specifications: wingspan—59 inches; wing area—340 square inches; length—30.5 inches; recommended prop—8x4.5 Scimitar folding prop, part no. GPE08045. The Bella-V sailplane sells for only \$129. Rumor has it that Hobby Lobby offers some great package deals with this kit. Contact Hobby Lobby Intl., 5614 Franklin Pike Cir., Brentwood, TN 37027; (615) 373-1444; fax (615) 377-6948.

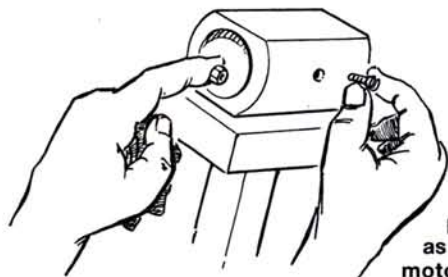


Hints & KINKS

by JIM NEWMAN

Model Airplane News will give a free one-year subscription (or one-year renewal, if you already subscribe) for each idea used in "Hints & Kinks." Send a rough sketch to Jim Newman c/o Model Airplane News, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON

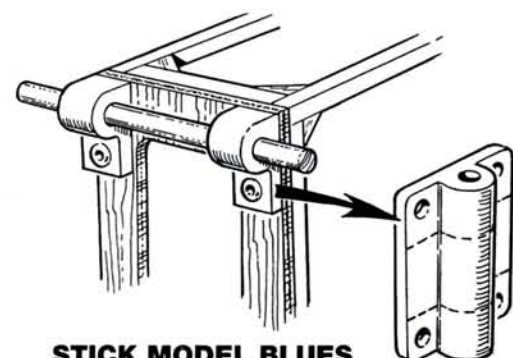
EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can't acknowledge each one, nor can we return unused material.



STICKY FINGER

If you need to start a nut in a deeply recessed place—such as in this electric motor case—stick the nut to your fingertip with contact cement. Tighten the screw from the outside, then peel your finger away from the nut.

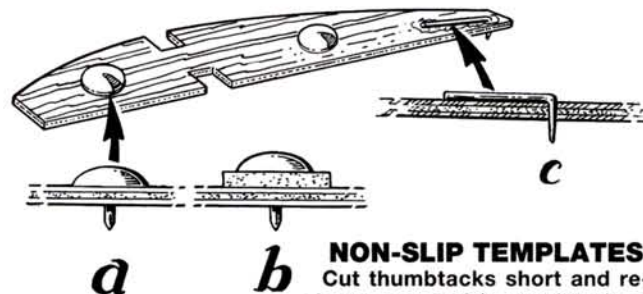
Charles Groth, Batavia, IL



STICK MODEL BLUES

A cartwheel landing can tear the wing dowels out and wreck the cabin of a stick-built model. Cut a nose-wheel bearing and attach it to the front cabin former with screws and nuts or with a pop rivet and a washer. These brackets will securely hold the wing dowels to the cabin frame.

Jesus Plaja, Hudson, FL

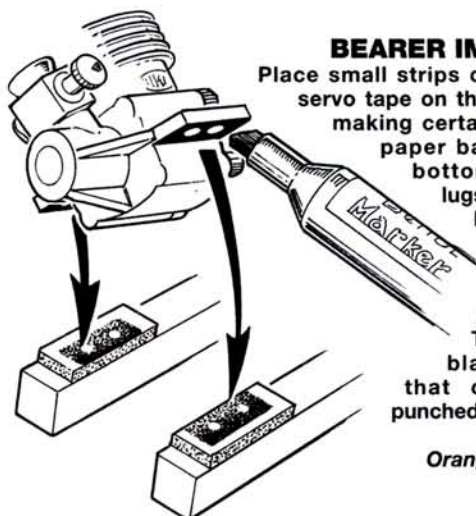


NON-SLIP TEMPLATES

Cut thumbtacks short and re-sharpen as in (a), or stick them through a glued-on shim as in (b).

In either case, the points should not go through the sheet wood that's being cut. A bent pin that's glued into the TE of the rib template stops the back end from flexing out of line under the cutting pressure.

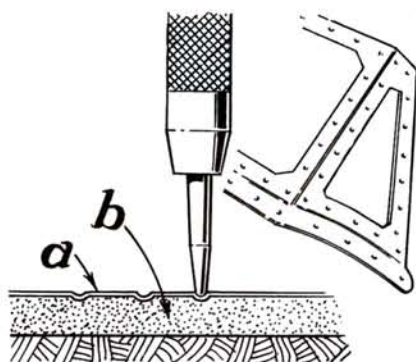
Fred Burman, Nowra, NSW, Australia



BEARER IMPRINT

Place small strips of adhesive-foam servo tape on the engine mounts, making certain to remove the paper backing. Coat the bottom of the engine lugs with an alcohol-based marker ink, then quickly and accurately press the engine onto the tape. This will leave a black impression that can be center-punched and drilled.

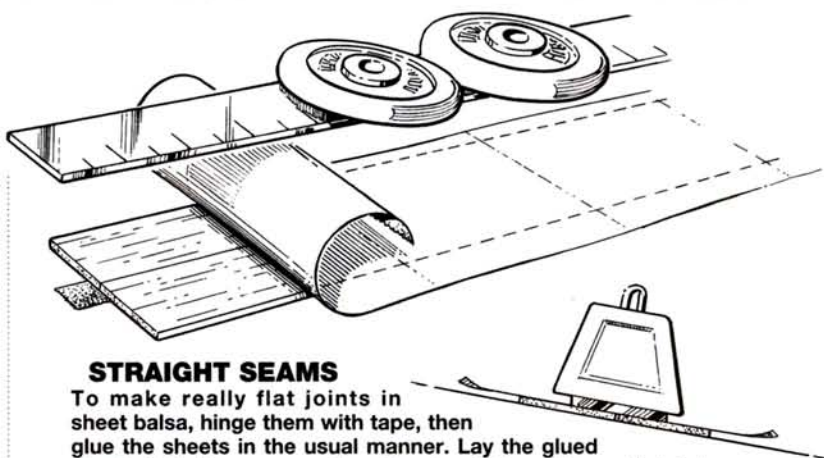
Peter Hohnmsem
Orange, NSW, Australia



SIMULATED RIVETS

Use an automatic center punch, suitably ground to produce the correct rivet shape, to dimple rivet heads on the reverse side of the material being used. The thin metal or plastic (a) is shown backed up by a piece of hard rubber (b).

Aubrey Nabers, Sautee, GA



STRAIGHT SEAMS

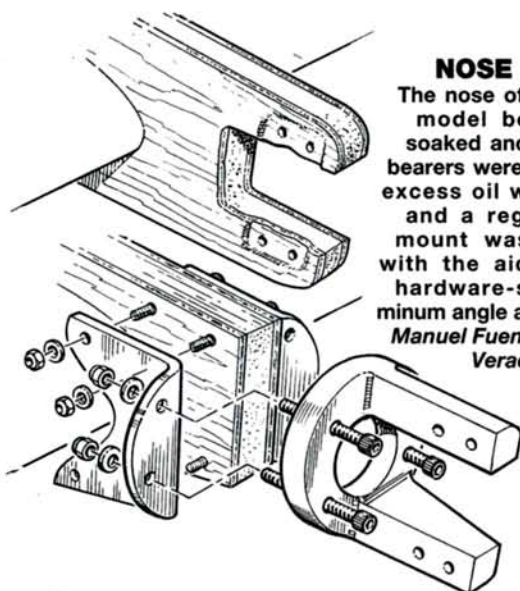
To make really flat joints in sheet balsa, hinge them with tape, then glue the sheets in the usual manner. Lay the glued sheets flat, place a paper towel on top, followed immediately by a stout metal straightedge and closely spaced weights. Wait until morning before removing the weights and straightedge so that the glue is thoroughly dry.

Larry Renger, Cerritos, CA

NOSE JOB

The nose of this fun-fly model became oil-soaked and weak. The bearers were cut off, the excess oil washed off, and a regular nylon mount was installed with the aid of thick, hardware-store aluminum angle and bolts.

Manuel Fuentes Rendon, Veracruz, Mexico

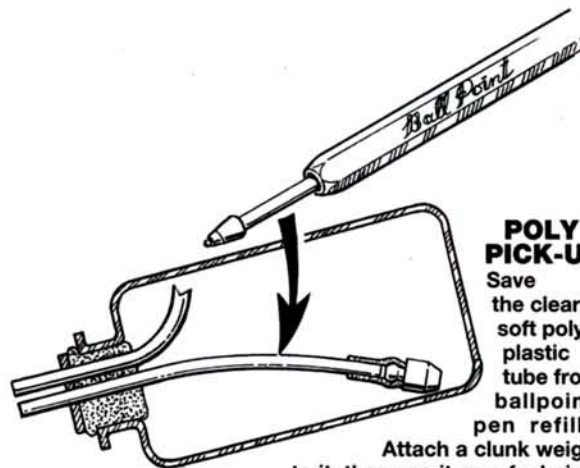


POLY PICK-UP

Save the clear, soft poly plastic tube from ballpoint-pen refills.

Attach a clunk weight to it, then use it as a fuel pick-up in your R/C fuel tank. This one-piece clunk line will not double up in a sudden stop. It's much more durable than thin brass tube, and it doesn't have a sharp edge that might cut rubber line.

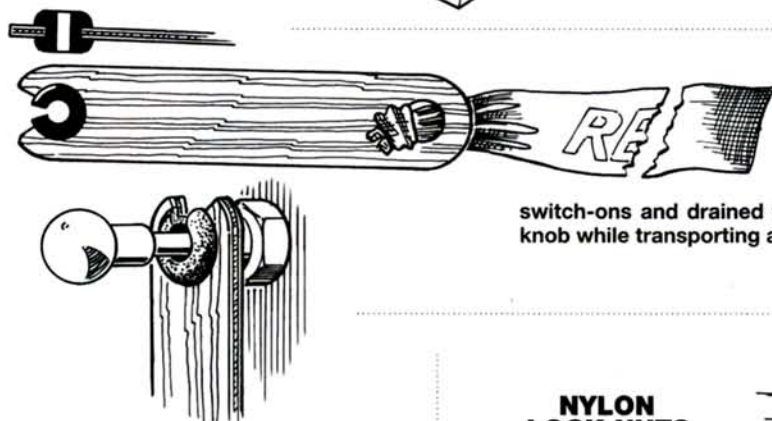
Fred Walker, Oldham, Lancashire, England



SAFETY SWITCH LOCK

Force a small, rubber, electrical grommet into a hole in a strip of 1/16-inch (1.5mm) plywood. Paint it a bright color or knot a bright streamer through the bottom hole. To avoid accidental switch-ons and drained flight packs, slip it over the "push for on" switch knob while transporting and parking the model.

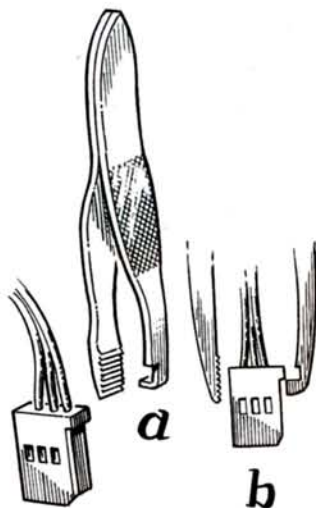
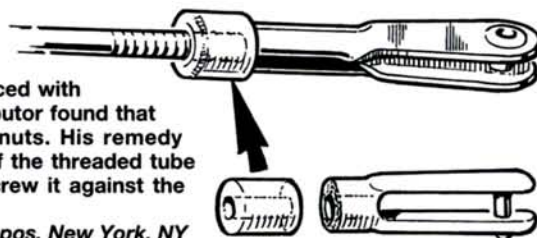
Ray Stocker, Farmington Hills, MI



NYLON LOCK NUTS

Nylon clevises were replaced with steel ones, but our contributor found that he did not have the locknuts. His remedy was to cut off a portion of the threaded tube of the nylon clevis and screw it against the steel one.

Federico Campos, New York, NY



SERVO-PLUG GRIPPERS

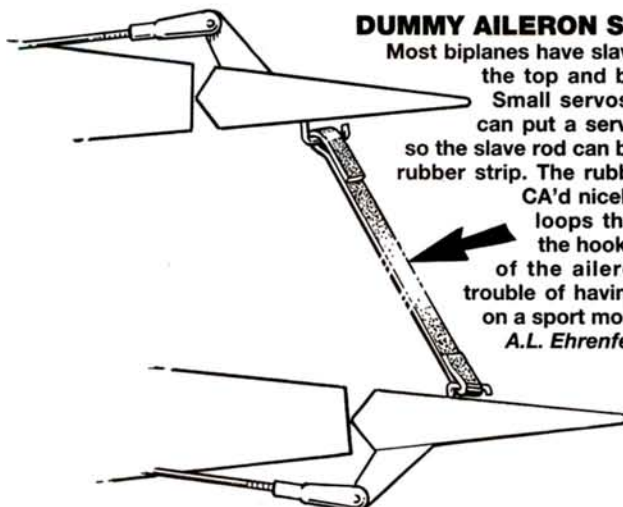
File or grind tweezers to grip the shoulders of Futaba plugs instead of the leads (which is a big no-no!). Shown in (a) is a modified dime-store tweezer, while (b) shows a modified Revlon no. 2346 Perfectweez.

Merle Miller Jr., Hemet, CA

DUMMY AILERON SLAVES

Most biplanes have slave rods between the top and bottom ailerons. Small servos now mean we can put a servo in each wing, so the slave rod can be just a piece of rubber strip. The rubber strip can be CA'd nicely to make small loops that will slip over the hooks on the surface of the ailerons. Saves the trouble of having clevises, etc., on a sport model.

A.L. Ehrenfels, Cheshire, CT



Pilot **PROJECTS**

A LOOK AT WHAT OUR READERS ARE DOING

SEND IN YOUR SNAPSHOTS

Model Airplane News is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable. We receive so many photographs that we are unable to return them.

All photos used in this section will be eligible for a grand prize of \$500, to be awarded at the end of 1997. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in!

Send those pictures to:
Pilot Projects, Model Airplane News, 100 East Ridge, Ridgefield, CT 06877-4606.

MASTER OF THE SKIES

This Ziroli T-6 is the handiwork of Chuck John of San Angelo, TX. The model has a fiberglass fuselage and cowl and built-up wings and tail, and its 101-inch-span wing is covered in Indy R/C World Tex fabric. Chuck used seven coats of auto primer, three coats of silver lacquer, two coats of high-gloss polyurethane spray and decals that he designed to create the Oshkosh theme on the T-6. A Brison/Sachs 4.2 engine with electronic ignition and coupled spark advance keeps the 25-pound craft airborne.



1/5- SCALE RYAN

This original design, scratch-built Ryan PT-22 is the handiwork of Francis McCracken of Clarkdale, AZ.

The 73-inch-span, 10 1/4-pound model has functional struts and flaps and is detailed with rivets in its thin aluminum sheeting and rib-stitches. With an O.S. FS .91 engine in its nose, the PT-22 has very good flight performance.



OUT OF THE ORDINARY

Paul Reinman of Stillwater, OK, designed and built this 5-pound, 94-inch-span flying wing and powers it with an O.S. .40FP engine. Paul says that the model has positive pitch stability, is neutral in roll and is capable of loops, rolls and inverted flight. He adds that adverse yaw hasn't been a problem. The model uses six channels: two for elevons, one for nose-gear steering, one for throttle, one to operate the bomb-bay door and one for the bomb release.



DOUBLE VISION

Peter Malchione of Avondale, PA, sent this photo of his stock Byron P-51s with their full-size counterparts, *Big Beautiful Doll* and *Frenesi*. He writes, "It was a once-in-a-lifetime chance to get a picture like this." We agree!

PORTRAIT OF A PILOT

Paco Leal of Guadalajara, Mexico, sent this photo of his father, Don Paco, and the Bucker Jungmann they built using a Pilot kit. The 83-inch-span model is covered with 21st Century fabric, weighs 19 pounds and flies beautifully and at a scale speed. It's powered by an O.S. BGX engine spinning a 20x8 propeller. Paco sculpted the pilot figure and also hand-painted the instrument panel.



DREAMBOAT

Richard Flinchbaugh of Newport, RI, scratch-built this flying boat from Ken Willard plans. He tells us that it can fly for more than 8 minutes on a single charge, flies like a dream and is equally at home on water or land. Richard's wife, Ginny, detailed the plane and contributed the lightweight red polyester dress-liner material for the fuselage covering.



BEECH KING AIR

Ed Hinshaw of Salisbury, NC, the chief pilot for a corporation that operates King Airs, always wanted a model of the transport plane. He enlarged 3-views of an F-90 from the pilot's manual and scratch-built this 1/6-standoff-scale model using balsa, foam and fiberglass. The 19-pound craft spans 95 1/2 inches, features functional flaps and Spring-Air retracts and is powered by two Moki .61 engines. Ed's 8-year-old son, Alan, seems impressed by Dad's masterpiece!



WINGS OVER QUEBEC

Daniel Vezina of Ste. Etienne, Quebec, Canada, scratch-built this Class A all-wood Defiant sailplane from Tom Hunt plans. The 92-inch-span model is powered by an AF 05G motor on 7 SR 1100 Max cells. The model weighs 40 ounces ready to fly.



SLICK'S LATEST

Jerry Smith sent in this photo of his friend Slick Larsen's beautiful, 10-foot-span Fiesler Storch. Slick, who lives in Marietta, GA, scratch-built the model from enlarged Bob Sweitzer plans and covered it with light-grade cecanite and dope. The 23-pound plane is powered by a G-38. Jerry tells us that Slick has about 30 giant-scale models in his basement, and all are ready to fly.



DESERT STORMER

Rod Bauer of Tulsa, OK, scratch-built this 68-inch-span A-10 Warthog using balsa, fiberglass and foam. He detailed the model with Krylon paints and a panel liner and handmade decals. The model is outfitted with a .40 O.S. engine, B&D retracts, flaps and a custom muffler. Rod says that it flies like a trainer and has excellent scale maneuverability.

SRNews

There are a lot of new things happening at SR Batteries. In addition to several new battery packs, we're now publishing both *Electric Flight Techniques* and *R/C Techniques*. In addition, we've also started a new series of Electric kits that we'll be releasing one by one over the next year. The first kit is the X⁴⁴⁰ made for us by X-Models. We'll tell you more about the X⁴⁴⁰ in a moment, but first, let's look at *Techniques*.

Techniques... is a new concept in modeling. It isn't a magazine, or a book. Instead, *Techniques* is an archive of modeling knowledge and expertise. Each volume of *Techniques* pinpoints a specific modeling task or problem and draws on our eight Contributors' 300+ years of modeling experience for solutions that work. With *Techniques*, you can easily build your own personal modeling library tailored to your personal needs.

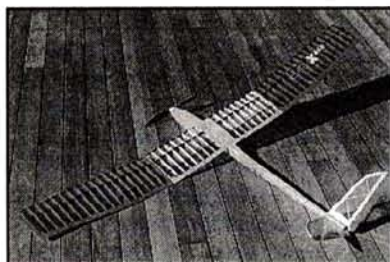
The basic idea behind *Techniques* is that after reading a volume, you should be able to do something you weren't able to do before reading that particular volume. It's that simple. The writing style used in *Techniques* will give you the feeling that you're visiting a master modeler's shop and looking over his shoulder while he works. Each volume is so jam-packed with information that if a paragraph were left out, you'd be missing something. No fluff, no bull, just pure "how to" information. If you'd like to be a better builder, finisher, or flyer, *Techniques* is for you.

There are two different editions of *Techniques* and you can subscribe to either or both of them. *R/C Techniques* covers the entire R/C field including Sport, Trainers, Pattern, Scale, Giant Scale, and Old Timers. You'll find information on building, materials, adhesives, proper radio installation, covering and finishing. In addition, *R/C Techniques* covers the trimming and flying of all kinds of aircraft from Trainers to Pattern ships. ARF's are included, too.

The second edition of *Techniques*, *Electric Flight Techniques*, gives you everything you've ever wanted to know about Electric Flight from the spinner to the battery pack. All of the tips and techniques that usually take years of trial and error to discover are included. If you'd like to do it right the first time and get the most out of Electric Flight, *Electric Flight Techniques* is for you.

If you'd like more information on how you can subscribe to either edition of *Techniques*, or find out which volumes are already available, just send us a self addressed, business size envelope with 55 cents postage and we'll send the information right out to you.

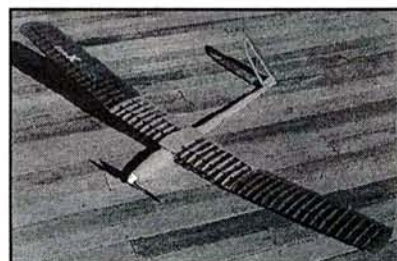
X⁴⁴⁰... Like all of you we love to fly but we don't have time to build. Sure there are Ready-To-Fly and ARF kits but for the most part they are lead sled plastic bags and they still take a bunch of hours to get flying.



The X⁴⁴⁰ is a "Custom Built" aircraft. Just install the servos and motor and you're ready to head for the field in less than an hour.

How does a wing loading of 7.5 ounces per square foot sound? Balsa is used where it should be used and carbon fiber and epoxy/glass are used where they should be used. The result is a 442 square inch aircraft that weighs only 10 ounces less radio and propulsion system! Everything is CNC computer machined so that the parts fit just right. In fact, the parts are so identical that we can stock extra wings, fuselages, and tails so you can be back in the air in a hurry if the unthinkable should happen.

The X⁴⁴⁰ is pre-covered with transparent yellow UltraCote™ on the stabilizers and wing center section and transparent red UltraCote™ on the wing tips. The spars, leading edge,



and push rods are made of carbon fiber. The fuselage is pre-painted yellow epoxy/glass with two plug in "V" tail stabilizers so the X⁴⁴⁰ comes apart easily for transporting or storage. Even the servo mounts are pre-installed. The two piece, take apart, wing has a span of 64.5" and a wing area of 442 square inches. It utilizes the S3021 airfoil and has a high performance aspect ratio of 9.4:1. Power is by either a Speed 400, AP29BB, or SR Max7 motor through a special 4.4:1 gearbox and should easily give you 30+ minute flights.

The price? Only \$229.95 but for a limited time the introductory price is \$199.95 plus shipping! We also have special Motor/Speed Control/Battery Pack and Rx/Servo packages available so you can make sure you have everything you need to get flying fast.

New Packs... For Electric flyers we have a new 1300 Max cell that's the same size and weight as our 1100 Max Series cell. For receiver packs we have new 1800 and 2800 Series cells designed for Giant Scale and Heli's. For transmitters, our 850 Series "AA" cell which will fit in any transmitter is now up to about 925mah which will almost double your flying time.

If you'd like more information or to place an order, contact us at SR Batteries, Inc., Box 287, Bellport, NY 11713, Fax 516-286-0901, Email 74167.751@compuserve.com, Phone 516-286-0079

ADVERTISEMENT

Product Guide

Airborne fun and function

FOR THOSE OF us who grew up with R/C model airplanes in the 1960s or earlier, today's equipment and accessories seem miraculous and sometimes mind-boggling! Of course, this is progress. Someone once said, "Most people are in favor of progress; it's the change they don't like." Much of the change over the past 40 years can be attributed to solid-state electronics and the evolution of the silicon chip. However, all scientific and technical knowledge has doubled four times during this period! When these advancements are coupled with inventive minds, astounding new products are possible.

Onboard (airborne) accessories and equipment are the subject of this

ONBOARD ACCESSORIES

by DAVE GIERKE

product review. A cross-section of trend-setting gadgets has been selected, illustrated and summarized. Radio-control systems and engines have been deleted; these have their own review schedules. For detailed application information and pricing, contact the manufacturer.

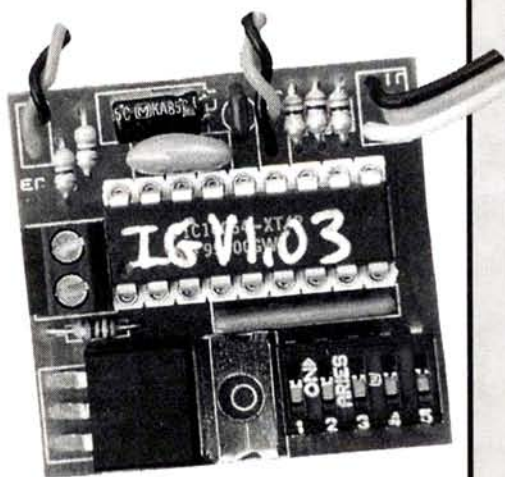
Ignition Unit for Rocket Motors

Imagine an X-1 model being dropped from a carrier plane, firing its engines, streaking across the sky under rocket power, then gliding to a smooth landing. Rocket-assisted takeoff (RATO), midair ignition and ignition with ROG takeoff are all possible with the Ignition Unit. This unique device gives the R/C modeler the ability to start rocket motors remotely. Rocket motors are ignited electrically with an onboard battery using approved igniters packaged with the motors.

The Ignition Unit is a "smart" device. It is run by a small microcomputer that incorporates multiple levels of safety to prevent premature or accidental ignition of the rocket motor. It features five operating modes, function reversing, 5-second countdown, LED mode indicator and arming switch. Installation is easy. The Ignition Unit is powered from the receiver battery, but the rocket motor is started with a separate ignition battery. The unit is designed to operate with all popular AM, FM and PCM radio systems. PME recommend that the rocket-

powered and rocket-equipped models be flown only by experienced, adult pilots. Specs: length—1.35 in.; width—1.25 in.; height—0.40 in.; weight—0.5 oz.; power consumption—2 to 15mA.

Part no.—IG110U; **price**—\$39.95. **Precision Micro Electronics**, P.O. Box 3129, Corpus Christi, TX 78463-3129; (512) 814-6843 (orders and information); (512) 814-5843 (customer service, fax and after hours).



Cline Proportional Fuel System

From the earliest Brown Jr. of 1932 to the latest computer numerical control (CNC) beauties from around the world, model airplane engines have always had fuel-delivery problems. The question has always been, "What system can provide the proper amount of fuel to the carburetor for all engine operating conditions?" Unfortunately, the answer is "none."

Automobile manufacturers struggled with carburetors for decades before giving up on them. Microprocessor-controlled fuel-injection systems now manage the quantity of fuel added to an engine's available air at an infinite number of throttle settings, shaft loads, air densities and other variables. This requires sensor and control technologies that are unavailable or unaffordable in miniature. Where does this leave us? Until technology catches up with what science tells us is possible, the Cline Proportional Fuel System provides the best solution I've seen to date.

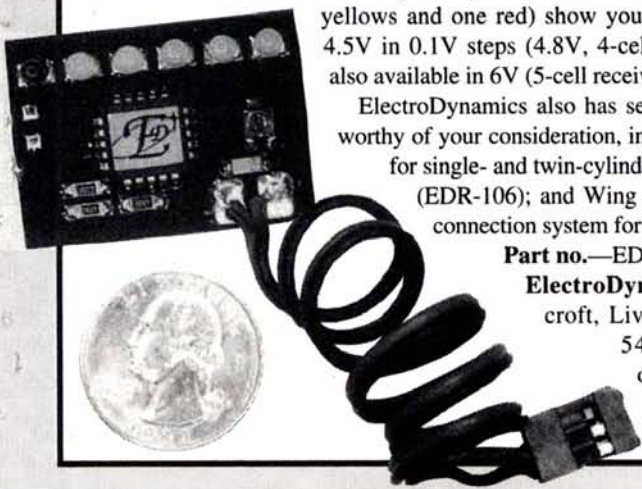
Onboard Battery Monitor

It has been a good day at the flying field. You've been flying all afternoon, and no mishaps! It's almost time to go home, but you need just one more hop before packing up. Unfortunately, there's this nagging feeling that the onboard battery may be too low. Worry no more! The Onboard Battery Monitor continually checks your battery pack onboard the aircraft as long as the receiver is on. Install it in a conspicuous location on the aircraft, e.g., under a clear canopy or in the dashboard, and always know your model is safe to fly. The unit plugs into any empty channel on your receiver or a Y-harness where it picks up the power lines. Five LEDs (three greens, two yellows and one red) show your battery voltage from 5V to 4.5V in 0.1V steps (4.8V, 4-cell receiver-pack version). It's also available in 6V (5-cell receiver-pack) version.

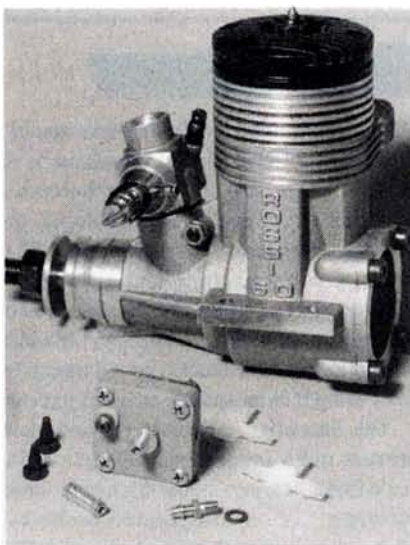
ElectroDynamics also has several other onboard products worthy of your consideration, including: GlowLite (EDR-103) for single- and twin-cylinder engines; Pro Servo Reverser (EDR-106); and Wing Connex (EDR-102), an inter-connection system for multi-servo wings.

Part no.—EDR-105; price: \$29.95.

ElectroDynamics Inc., 31185 Schoolcroft, Livonia, MI 48150; (313) 422-5420; fax (313) 422-5338; orders (800) 337-1638.



The system will work on all 2-stroke and 4-stroke model airplane engines. Here's how it works: pressure in excess of 2psi is directed into a standard fuel tank. It's trapped there by a check valve (one-way valve) in the pressure line. Crankcase pressure is the preferred method in the 2-stroke engine, while muffler pressure works with most 4-stroke engines. This pressurized fuel is delivered to the regulator. The regulator consists of a large diaphragm and a fuel control valve. As air passes through the throat (venturi) of the carburetor, a negative pressure (suction) is produced, relative to ambient or atmospheric pressure. Since one side of the regulator diaphragm is vented to the atmosphere and the opposite side to the carburetor, a pressure differential exists, providing a force that moves the diaphragm. As the suction increases or decreases to the carburetor, the diaphragm moves proportionally. The greater the diaphragm deflects, the more pressurized fuel from the tank is allowed to flow through the regulator valve to the carburetor. The system will move up to 4.5 fluid ounces of fuel per minute. Some important considerations: there are no adjustments to



make with the PCFS; the fuel tank can be located anywhere; the regulator must be kept as close as possible to the carburetor; and at least 2psi of pressure must be provided to the tank.

The unit includes all necessary fittings, instructions, diagrams and troubleshooting suggestions.

Price—\$45.

Cline & Associates, 807 Alpha Rd., Box 44, Alpha, OH 45301; (932) 426-4167.

Super GlowLite

You've finally saved enough money to purchase that great 5-cylinder radial engine. You know the one: it's going to power your entry at this year's Top Gun scale competition. After unpacking the monster and reading all of the instructions, it dawns on you; how are you going to light five glow plugs?

ElectroDynamics has the answer. All the reliability and ease of use that made their GlowLite (EDR-103) popular for single- and twin-cylinder engines is now available for the multi-cylinder enthusiast (3 to 5 cylinders). It's called the Super GlowLite. The unit works with 4.8V, 6V, AM, FM, or PCM receivers. An adjustable turn-on/turn-off point for the glow heat is conveniently provided on the housing of the unit along with a servo-reversing switch to match the TX/servo direction. The solid-state controller is connected to the throttle channel port of the receiver by a Y-harness. The unit includes an R/C system connector (Futaba-J/R compatible) and Sermos power connectors for the glow-plug circuit.

Power for the glow plugs is supplied by a single 4400mAh or larger Ni-Cd (1.28x2.37 in., 5.5 oz., not included). Full accessory kits are available, including glow batteries, glow-plug connectors, chargers and charging jacks.

Part no.—EDR-103M; price: \$79.95.

ElectroDynamics Inc., 31185 Schoolcroft, Livonia, MI 48150; (313) 422-5420; fax (313) 422-5338; orders (800) 337-1638.



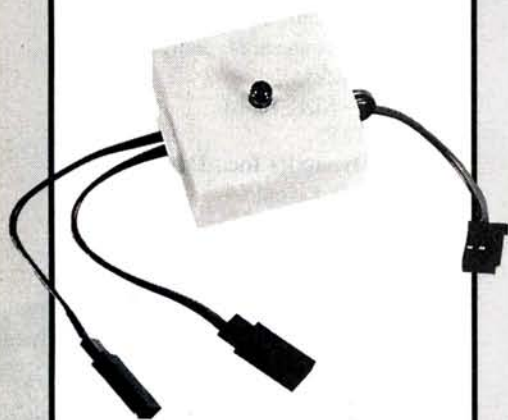
Ultimate Battery Backer

Sometimes I wonder how we survived in the early days of R/C without the wonderful battery management and backup systems that are available to us today. Oh yes, now I remember: we crashed!

The best way to ensure reliable battery power to your model is to use two battery packs and two switch harnesses. Your radio will run on the main battery pack until the voltage drops to a preset quantity, then the Ultimate Battery Backer switches to the backup battery pack. The system works with standard 4-cell, 5-cell, or gel-cell packs. The main and backup battery packs can be of different capacity, e.g., 1200mAh and 600mAh. The solid-state design uses MOSFET transistors. This system has been used in professional RPVs with satisfactory results. The unit is supplied completely wired, or without the switch harness and wiring. Specs: size—1.5x1.5x0.75 in.; weight—0.6 oz. (without connectors).

EMS manufactures other fine onboard products for R/C aircraft, including the 6-channel Glitch Buster, Gear Door Cycler, Twin-Engine Synk System and several products for electric flight.

Prices: \$49.95 (without connectors), \$59.95 (wired, with connectors).



Electronic Model Systems, 22605 E. La Palma Ave., Ste. 518, Yorba Linda, CA 92887; (714) 692-1393 (technical support); orders (800) 845-8978; fax (714) 692-1330.

Three decades ago, an excited public watched and listened as engineers at Cape Canaveral discussed the performance of America's latest spacecraft as it orbited the moon. The steady stream of technical information—temperatures, pressures, voltages and more—were transmitted to earth by radio. Telemetry made the vehicle seem like it was in a laboratory, and not 270,000 miles away!

Aero Telemetry's primary business is with the U.S. government. They supply the military with telemetry systems for remotely piloted vehicles and similar applications. Several years ago, they began developing a system for the R/C market. Today, it's called the model 300R—a fully tested, third-generation development. Consisting of



three channels, it's capable of accurately measuring and telemetering engine rpm, airspeed and battery voltage—up to 1/4 mile away. The 300R incorporates a lightweight, low-power, microprocessor-based digital transmitter and fully integrated sensor circuitry. The hand-held receiver is portable and compact. Data is displayed on a liquid-crystal display (LCD) in English units and real time. The system is calibrated at the factory and is ready for installation in the model. A detailed instruction manual and a rugged carrying case are included.

I have been using this system for the past two seasons for the in-flight portion of my "Real Performance Measurement" (RPM) column and can verify its outstanding execution, reliability and repeatability.

Part no.—300R; **price**—\$1,195.

Aero Telemetry Inc., 947 W. 30th St. #24, Los Angeles, CA 90007-2469; (800) 746-9380 (orders); (213) 746-7296 (information).

Air Screamer

Who's going to be the first to have one of these at the flying field? The Air Screamer is an air-driven siren—no motors or batteries are required. According to the developer, the Air Screamer required "... over two years, 12 prototypes, a wind machine and a dB meter" to achieve success. They say the Air Screamer is "A true air siren, not a cheap toy." It's intended for screaming dive attacks, but pilots can benefit from using it as an audible airspeed indicator.

The Screamer is lightweight and plastic to prevent radio interference. Precision double-sealed ball bearings allow high-rpm siren performance. A servo-operated brake system allows the siren to be turned on and off during the flight, making it more impressive and fun. Although the Air Screamer can be heard over any engine, it's claimed to be non-offensive.

Each Air Screamer has been tested at the factory and arrives complete and ready to use. Bolt it on directly or use the included brass mount assembly, which allows quick attachment and removal from any wing and most landing gear. Specs: siren body—2.5x2.5 in.; siren weight—7 oz.; brass mount weight—2 oz.; 8,000rpm at 70mph (stock deflector blades); factory-test rpm—14,000.

Different pitch deflector blades are available for faster or slower models.

Price: \$89.

i4c Products, 6924 E. 92nd, Tulsa, OK 74133-5318; (918) 492-9435; fax (918) 492-9375.



GlowDriver for Airplanes

Are you tormented by cantankerous engines? Frustrated with inverted engines that refuse to idle smoothly or that die on you unexpectedly? Does the idea of having to reach around a spinning propeller to remove the glow-starter from a running engine give you the chills? If so, the PME GlowDriver for airplanes may be for you. The GlowDriver gives you the ability to install an onboard system that will keep the plug hot just when your engine needs it the most: during starting, idling and low throttle settings.

The GlowDriver is a tiny microcomputer that has been programmed to control a powerful FET transistor to do electronically what other systems do with relays or switches. The unit features eight on-points and eight off-points, function reversing, a small LED indicator to help with setup (the LED is on when the glow system is on) and a safety feature that turns the system off if your transmitter is off.

The GlowDriver is plugged between the throttle servo and the receiver. The unit is programmed to turn on (power the glow plug) after a certain amount of throttle trim has been given, and to turn off after the throttle stick has been advanced a particular amount. The on- and off-points are set with a simple dipswitch.

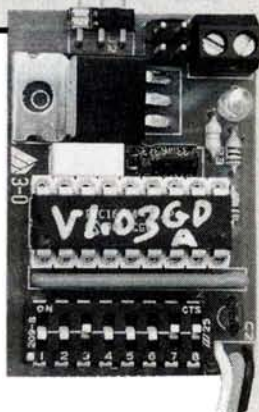
The GlowDriver can drive two glow plugs, so controlling twin-cylinder and two-engine models is a snap. It's designed

to work with all popular AM, FM and PCM radio systems. It requires a 1.2V Ni-Cd cell with between 600 and 1000mAh capacity. Specs: length—1.7 in.; width—1.2 in.; height—0.4 in.; weight—0.4 oz.; power consumption—2 to 15mA.

PME produces several other quality products, including ElevonMixer for Airplanes (EM310A), Engine Synchronizer System for Airplanes (ES410A), ServoReverser (SR510A) and ThrottleSwitch for Airplanes (TS610A).

Part no.—GD210A; **price**—\$34.95.

Precision Micro Electronics, P.O. Box 3129, Corpus Christi, TX 78463-3129; (512) 814-6843 (orders and information); (512) 814-5843 (customer service, fax and after hours).



Flight Alarm

The Flight Alarm plugs into any servo connector to provide a full-time battery monitor and downed-aircraft locator. The alarm's sound level is better than 95dB at 3 feet. The unit monitors the flight battery whenever the receiver is on. Should the voltage drop below 4.725 volts (+/- 0.025), even for a moment, a pulsating alarm is sounded to give an early warning. A 6V unit is also available.

When used with an AM or FM control system, any loss of transmitter signal will cause the alarm to sound. If your plane goes down, simply turn off the transmitter and use the sound as a homing device. This function can also be used as a preflight frequency check. A separate model is also available for PCM radio systems. Specs: diameter—1.75 in.; weight—less than 1 oz.; current—less than 5mA when sounding.

Price—\$29.95 (includes S&H). **C-Tronics Inc.**, P.O. Box 192, Ramsey, NJ 07446; (201) 818-4289.



Maximum Airspeed Indicator

Hobbytech's onboard Maximum Airspeed Indicator measures the highest airspeed achieved by your model during flight and reports the information after landing. Simply plug in your digital voltmeter and use the provided chart to convert your voltage reading to mph.

Because it's mounted aboard the airplane, the Maximum Airspeed Indicator measures true airspeed. Radar guns and ground-based timing devices measure the model's speed relative to the ground. This is called "ground speed" and doesn't measure the model's true

speed. Compared to currently available telemetry systems, the MAI is relatively inexpensive and simple to use.

The unit is simple to install. A pitot tube is installed away from the propwash and at some leading point on the aircraft, e.g., wing leading edge. The pitot tube is connected to the device inside the airplane via flexible tubing.

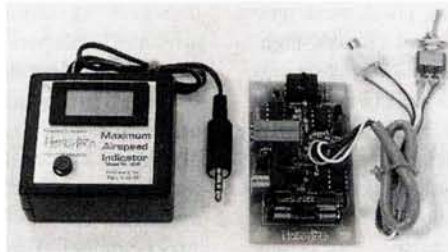
The airspeed circuit board is secured

by four screws. The unit works by measuring precisely the air pressure about 2 inches in front of the pitot tube. This pressure is converted to an electrical value corresponding to the true airspeed.

The installed unit can be turned on and off via a small switch. After flying and landing your plane, plug the optional device for digital readout (DDR) into the jack on the unit. This display shows your maximum speed in mph. The MAI will hold the maximum speed for about 20 minutes. Reset the unit by turning it off and on again. If you choose not to purchase the optional DDR, then plug your voltmeter into the jack and take your reading. A conversion chart (provided) will tell your speed in mph, km/hr and knots. Specs: dimensions—3x1.75 in.; weight—3.2 oz.; power—miniature 12V battery; range—15 to 250mph; accuracy—+/- 2mph between 15 and 150mph, +/- 1mph above 150mph; operating temperature—-20°C to +75°C.

Part no.—DRD-A (airplane version); **prices**—\$109.95 (MIA), \$69.95 (DDR).

Hobbytech Inc., 34 Joslyn Dr., Elgin, IL 60120; phone/fax (847) 695-5903.



RoboStruts

Anyone who has attempted to fabricate bent-music-wire landing gear knows how difficult the task can be. I can usually bend the first wing-mounted main gear in a relatively short period of time. Unfortunately, trying to duplicate all these dimensions in mirror image can be frustrating, time-consuming and a waste of materials.

The RoboStruts series are replacements for wire landing gear. This new line of products includes series 380, 440, 500 and 625.

The series 380 are suitable for most airplanes weighing 4 to 10 pounds. With real functioning Oleo and torque links, they can be used on grass or paved fields. The series 380 RoboStruts are available in straight, right or left offsets up to a 3.25-inch wheel. Fork-style Oleos are also available. This series strut comes with new, easy-to-use $\frac{5}{32}$ -inch (4mm) and $\frac{3}{16}$ -inch (4.8mm) diameter wire adapter bushings. Only the highest-strength, real-aircraft-grade materials and construction techniques are used in RoboStruts.

Series 440 RoboStruts are designed for models weighing between eight and 16 pounds; series 500, up to 25 pounds; series 625, up to 55 pounds.



Prices: series 380—\$40.95 to \$45.95 each; series 440—\$44.50 to \$49.95 each; series 500—\$44.50 to \$49.95 each; series 625—\$49.95 to \$55.00 each.

Robart Mfg. Inc., 625 N. 12th St., P.O. Box 1247, St. Charles, IL 60174-1728; (630) 584-7616; fax (630) 584-3712.

Genesys In-Flight Power System



Sullivan has produced a direct-current generating system for recharging your flight-pack batteries while you operate your model. But Genesys can do much more. Once your engine is running faster than at idle, (about 2,500 to 3,000rpm), the generator can supply the current needed to run the onboard radio receiver and servos while continuing to recharge flight-pack batteries. If a system component fails or the engine stops, the flight batteries supply current to the receiver and servos in a normal fashion.

The central control unit (CCU) has five accessory output jacks for optional accessories; these include: strobe lights (S662), rotating beacon (S663), radio-

ProSpark

In the early days (1932 to '47), model airplane engines used spark ignition to fire gasoline-based fuels. There were many problems, including short-lived carbon cells, fouled spark plugs, weak ignition coils, difficult-to-adjust contact points, short circuits, high-voltage shocks and added weight. Otherwise, spark ignition was easy! Modern "sparkers" have fewer problems and offer important advantages over glow-plug-equipped engines. For example, spark ignitions work well with gasoline, alcohol and nitromethane-based fuels—glow plugs don't work well with gasoline; ignition point and spark advance can be accurately controlled; and the engine can be stopped by switching off the ignition switch.

ProSpark is an electronic advance-ignition unit for single or simultaneous-firing twin-cylinder applications. It allows the user to change the spark advance from between 22 to 38 degrees before top dead center (BTDC) electronically by adjusting a potentiometer (on the ignition module) while the engine is running. This adjustment feature ensures maximum performance (rpm) from various engine/propeller combinations and a variety of operating environments, e.g., atmospheric conditions, cooling within the cowl.

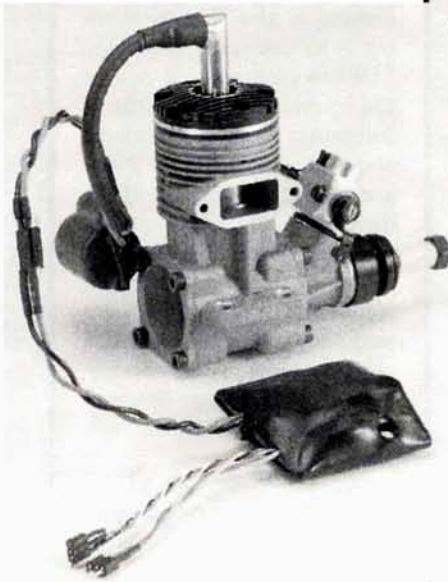
The ProSpark system consists of a Hall effect sensor, magnet, high-voltage coil, spark-plug lead, and an ignition module. The user must provide a 4-cell Ni-Cd battery pack (4.8V/1200mAh), which will provide eight full-throttle runs of 15-minute duration, and an on/off switch capable of handling at least 1 amp of current.

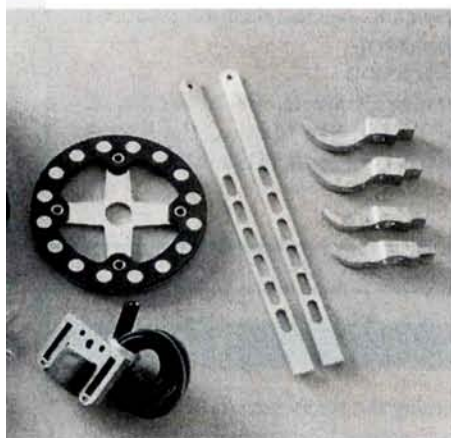
A great safety feature of ProSpark concerns starting. The sys-

tem is programmed to start the engine at 0-degree ignition advance, independent of the throttle setting. This helps prevent dangerous "kick-back" and thrown propellers, common with 4-stroke engines. This is also beneficial to operators who hand-start larger engines. Specs: advance adjustment—22 to 38 degrees (above 5,000rpm); operating voltage—4.6 to 6.5 volts; current—120mA (spark plug not firing); 600mA (at maximum rpm); engine rpm—0 to 21,000; 1200mAh (4-cell) 2-hour capacity at full throttle; spark plug gap—0.015 to 0.025 in.; spark plug firing voltage—30000V (minimum).

Price: \$169.

Cabral Systems Inc., 2459 SE Tualatin Valley Hwy. #465, Hillsboro, OR 97123-7919.





operated switch (S664), navigation lights (S665) and landing lights with R/C switch (S667). All these operate on current supplied by the generator with no need for extra batteries or drain on the flight-pack batteries. However, at slow idle or when the engine stops, the flight-pack batteries pick up the load. The R/C Switch allows the accessory, such as landing lights, to be turned on or off.

Genesys gives the option of running system accessories and battery recharging, running only the system accessories,

or recharging a separate battery pack.

Without accessories, Genesys weighs about 5.5 ounces. It can charge 4.8V or 6.0V battery packs; there's a voltage-selection switch mounted on the surface of the CCU. Depending on your engine's power and the load applied by Genesys, expect to lose between 200 and 400rpm. There's no such thing as a free lunch!

Genesys operates by spinning a specially designed ring containing 16 rare-earth magnets past a transformer (induction coil). The electricity is then routed to the CCU, which has two direct battery-output jacks, a remote charge-indicator jack and five accessory output jacks. Accessories plug directly into the CCU.

The transformer can be installed solidly below the engine, attaching to the forward portion of the front housing or crankcase. Specially engineered mounting clamps and straps are provided for this purpose. After clamping, an air gap of between 0.005 inch and 0.035 inch must be formed between the transformer and the rotating ring of magnets. However, a stronger low-rpm output will result at the lesser gap. Some commonsense notes of cau-

tion: never fly without a battery pack. For safety, a flight-pack battery must always be part of the receiver/servo system—either through the CCU or directly to the receiver. There must be sufficient charge in the flight-pack battery to land the model if the engine stops. Remember, if the engine stops, the generator can't supply electrical energy!

Part nos.—S660 (base unit); S662 (strobe light); S663 (rotating beacon); S664 (radio-operated switch); S665 (navigation lights, red, green and white); S667 (landing lights with R/C switch). **Prices**—\$89.95; \$24.95; \$29.95; \$29.95; TBA.

Sullivan Products, P.O. Box 5166, One North Haven St., Baltimore, MD 21224; (410) 732-3500; fax (410) 327-7443.

R/C Talker

The R/C Talker performs telemetry of in-flight function to a ground-based receiver, which provides a spoken report. This unique format enables the pilot to monitor these functions without looking away from the model.

The system includes a transmitter (T5150), receiver (R5150), airspeed sensor (ASPS-2400), tachometer sensor including a photocell, heat-shrink-surrounded circuit board, connecting cable and connector. A pitot tube and instruction manual complete the factory supplied items.

The R/C Talker is controlled through an auxiliary channel on the ground-based transmitter. The telemetry system is designed to monitor the pulses received from this channel; if any deviation from expected pulses is detected, the R/C Talker immediately shuts down, waiting to receive the pilot's re-activation before resuming transmissions. The system samples the function input channels 2,000 times per second, filtering this data so it captures only those values that are maintained for 0.1 second or more.



If the pilot turns the system off during flight, the ground-based unit will stop talking. However, the R/C Talker Transmitter will continue to accumulate data during the flight. Later, if the Talker Transmitter is re-enabled (switched on), data will be radioed back to the ground. This feature allows the pilot to shut down the transmitter during a critical flight period, e.g., a race or critical high-speed pass.

Other functions available separately include an altimeter and accelerometer.

Price: \$400.

Condor R/C Specialties, 1733-G Monrovia Ave., Costa Mesa, CA 92627; (714) 642-8020; fax (714) 642-8021.

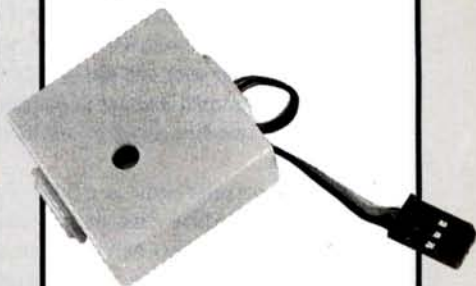
The Snitch

(JOMAR Product)

The Snitch, a fine product from the hometown of Richard Nixon—with no 18-minute gaps in the tape—is an airborne micro controller that counts and records glitches and missed signal frames during flight for later playback. When the model is on the ground, the unit counts out in audible tones. Great for troubleshooting noisy ignition systems or trying new equipment configurations. The Snitch also warns of interference on your frequency and reminds you to turn off your receiver. Specs: size—1.32x1.32x0.64 in.; weight—0.6 oz.

Price: \$39.95.

Electronic Model Systems, 22605 E. La Palma Ave., Ste. 518, Yorba Linda, CA 92887; (714) 692-1393 (technical support); orders (800) 845-8978; fax (714) 692-1330.



Perry Carburetor

This aftermarket product isn't new. In fact, the inventor, John Perry, has been deceased for several years.

However, when a product is this good, it deserves renewed recognition from time to time. Designed in the 1960s, the Perry carburetor provided many of us with our first reliable R/C throttle. Today, the design remains state-of-the-art, with

some engine manufacturers continuing to provide the carburetor as standard equipment.

Operation is simple. The idle speed screw raises the idle speed by setting the closed-point stop on the throttle barrel; the idle mixture disk regulates the idle mixture. A clockwise movement of the disk leans the mixture, and a counterclockwise movement richens the mixture—it's as simple as that! A final test of the

setting is to hold the nose of the airplane up and down. If the engine quits in the up position, the mixture disk is set too lean. If it quits in the down position, it's too rich.

Varsane Products can supply Perry carburetors for almost any engine



engines is the Regulating Pump. Advantages of this product include mounting the tank anywhere within the model and uniform fuel delivery throughout the engine run—no more lean settings as the tank empties.

Here's how it works: atmospheric pressure forces the fuel from the tank to the precision regulator section of the pump, then on to the carburetor. The correct pressure is adjusted by a hex screw on the rear of the pump.

application. Contact them for additional information.

Price: \$36.95.

Varsane Products, 546 S. Pacific St., Ste. C-101, San Marcos, CA 92069; (619) 591-4228; fax (619) 591-9211.

Perry Regulating Pump

Another John Perry invention that has helped to revolutionize the fuel delivery process associated with 2-stroke cycle

Turning the screw inward increases the flow; outward decreases the flow. The pump is energized by the engine's crankcase pressure; a fitting is provided for installation in the back cover of the engine.

The Regulating Pump is recommended for all carburetors equipped with two needle valves. Perry (non-pump) carburetors and air-bleed types are not recommended; they tend to operate rich in the mid-throttle range. The VP-30 (red cap) is designed with materials compatible with alcohol-based fuels, while the VP-40 (black cap) is intended for gasoline, diesel fuel and smoke units.

Part no.—VP-30; **price:** \$32.95.

Varsane Products, 546 S. Pacific St., Ste. C-101, San Marcos, CA 92069; (619) 591-4228; fax (619) 591-9211.

Tetra Bubbleless Fuel Tank

The Tetra Bubbleless fuel tank is the best tank, from a performance viewpoint, on the market today. The unit provides fuel to the engine without air bubbles—the main cause of erratic, damaging, lean-engine operation. Because of its design, the tank doesn't need to be soft-mounted inside the airplane; vibration can't induce air bubbles in the fuel.

Tetra uses the concept first utilized by NASA for pumping cryogenic liquids from propellant tanks aboard spacecraft operating in weightless conditions. They called the process and related hardware "positive expulsion." Here's how it works: the tank consists of a conventional hard outer case and a soft, pliable inner bladder. The inner bladder is carefully filled with fuel so there's no air present. Pressure is then applied to the space between the outer case and the bladder. Airless/foamless fuel is delivered in a normal manner to the carburetor. Most users prefer a simple two-line system: one fuel-delivery line and one pressure line.

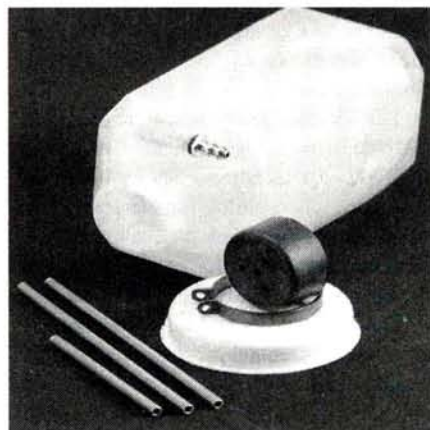
All these benefits come at a price. Fueling requires attention to detail: the bladder must be evacuated of air (syringe) and clamped off (hemostat) before attaching the fueler and filling with a measured quantity of fuel; overfilling can damage the

fragile bladder! If muffler or crankcase pressure is used to pressurize the tank, oil residue from the fuel collects between the outer case and the bladder; this must be evacuated every few runs to prevent problems.

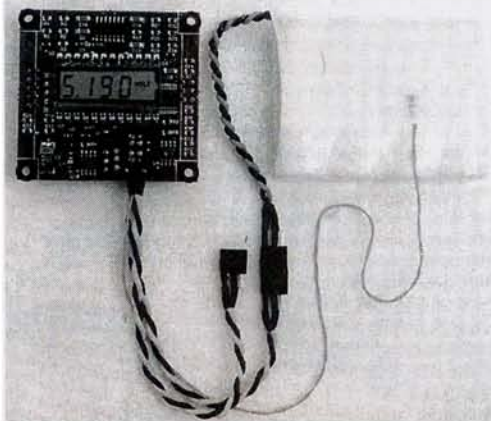
So, if you're a pattern or racing enthusiast who doesn't mind a little inconvenience to obtain the very best, the Bubbleless Fuel Tank may be for you. It's available in many popular sizes; contact world pylon-racing champion Dave Shadel at Performance Specialties for more information.

Price: \$24.95 (8.5 ounces).

Performance Specialties, P.O. Box 3146, Gardenville, NV 89410; (702) 265-7523; fax (702) 265 7522.



Battery Fuel Proof



The Battery Fuel Proof is a complete programmable battery monitor and battery data-acquisition system for R/C model aircraft. The system's LCD is flush-mounted to a surface of the model, e.g., the fuselage side, where you can "see" the condition of the battery—its remaining battery capacity, voltage, current and temperature.

Although it's not required, those of you who have access to a PC can extend your BFP into a laboratory-grade programmable battery cyclor and data-acquisition system. Hobbytec supplies a serial cable and Windows software for this unique system. Also, the BFP allows you to charge your onboard batteries using your own charger; a built-in trickle-charge controller allows you to connect your charger and forget it. Finally, a low-voltage alarm warns of critically low battery voltage. Connected between the battery and switch harness, the BFP works with Ni-Cd, NiMH and Pb cell technologies from 3 to 16 volts. Specs: four-digit display with 1.1x0.35-in. viewing area; small exterior size—2.1x2 in.; sleep mode consumes 200uA.

Price: \$149.95.

Hobbytec Inc., 7416 W. 38th St., Tulsa, OK 74107; (918) 446-6128.

Fuel Level Sensor

Here's one for the R/C'er who has everything! Aerial Dynamics has a Fuel Level Sensor System that flashes a high-intensity strobe light to warn you of a low-fuel condition. The strobe light is mounted under your model and is clearly visible in full daylight.

A gold-plated sensor probe is secured inside the fuel tank, slightly above its bottom. This distance represents your fuel reserve limit. When the fuel level drops below this set-point, the solid-state controller actuates the strobe light. The unit is equipped with a power switch and requires a separate 4.8V battery pack. Specs: circuit board dimensions—1.625x1 in.; operating voltage—4.8 volts; current dissipation—6mA; output current: 3 amps; strobe rate—1 in 5 seconds to full on; weight—0.6 oz. (minus battery).

Part no.—ADFS2; **price:** \$58.

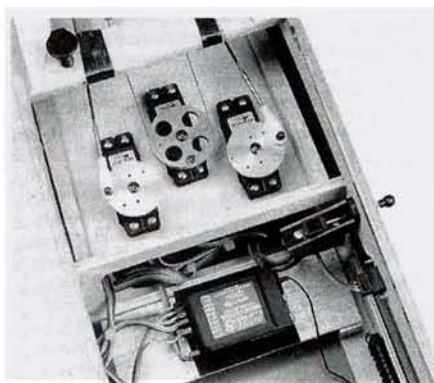
Aerial Dynamics, P.O. Box 5535, Glendale, CA 91221; (818) 500-8802.

Aluminum Servo Arms, Wheels and Link Sets

One of the most overlooked weaknesses with modern R/C equipment is finally being addressed. Since true mechanical control starts at the servo, Hangar 9 is now producing a complete line of pro-level control system enhancements to ensure total precision.

Gold-anodized pull/pull wheels allow the use of a one-piece cable for a control system with zero flex. CNC-machined from aluminum alloy, these wheels come in three sizes and are available to fit all popular radio brands. They accept up to 0.040-inch cables.

Aluminum servo arms and wheels elimi-



nate the flex found in plastic servo arms and wheels. The wheels come in three sizes while the servo arms are available in half or full sizes. Both feature pre-drilled and tapped 2mm holes with versions available to fit all popular radio brands. Hangar 9 Link Sets are used to connect pushrods to these machined arms and wheels.

See these products at your hobby shop, or contact Horizon Hobby Distributors for information and prices.

Hangar 9; distributed by Horizon Hobby Distributors Inc., 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511.

Voltage Proof

Hobbytec also markets another onboard system called Voltage Proof. This unit consists of a flush-mounted 4-digit LCD voltmeter and a dip-switch, which programs the number of Ni-Cd or NiMH cells being used. A low-voltage alarm sounds if the voltage gets too low for the number of cells selected. Specs: three to 16 volts; internal size—1.7x0.8 in.; external viewing dimensions—1.1x0.35 in.

Price: \$39.95.

Hobbytec Inc., 7416 W. 38th St., Tulsa, OK 74107; (918) 446-6128.



READERS' GALLERY

Bee 314

by LARRY
MARSHALL

I think that if Albert Einstein had been a modeler, he would have had a keen appreciation for those within the modeling community who show vivid imagination. These people provide us with things to talk about, they demonstrate skills we aspire to have and, most of all, they make this hobby more enjoyable for all of us.

So it was when Clancy Aviation produced their first Lazy Bee. This design has taken the modeling community by storm. Bees are everywhere! There are large Bees, small Bees, Bees on floats, electric Bees, and now there are even Speedy Bees. Clubs have Bee races and Bee



Thayer's Bee 314 is an amphibian, sporting wheels when required.

fun-fly events, and people are learning how to fly with Lazy Bees. It's clear that Andy Clancy's imagination has excited the imagination of many others in their quest for a fun afternoon.

the product of Thayer Syme's vivid imagination. He has formed a less than obvious liaison between Clancy's design and the Boeing 314, a magnificent flying boat that represents an exciting time in aviation history. Thayer gives us a chance to reflect on this beautiful aircraft and a time when everyone was fascinated with aviation. It was a time when large flying boats were the solution to take-offs and landings when paved runways were not long enough to accommodate large commercial passenger and transport planes. One Boeing 314, the Yankee



"Imagination is mo



Two Graupner 11x7 3-blade props provide the thrust to get this mighty flying boat into the air.

SPECIFICATIONS

Type: sport electric

Wingspan: 56 in.

Wing area: 896 sq. in.

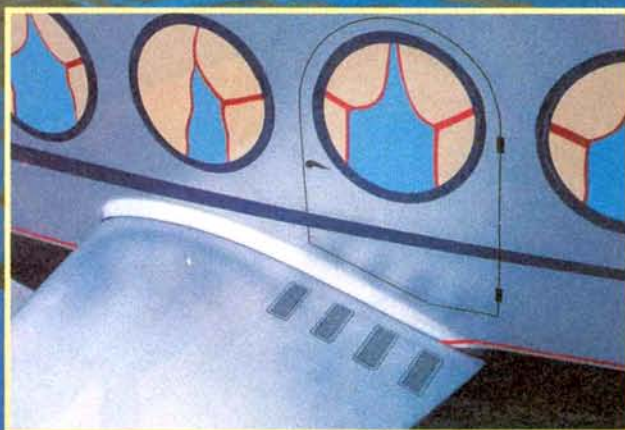
Weight: 5 lb.

Construction: balsa flying surfaces; fuselage is blue foam covered with two layers of 6-oz. glass cloth.

Finish: Micafilm

Motor system: two Astro 035s with 3:1 gearboxes, 14-Sanyo 1700SCRC cells, Graupner 11x7 3-blade props.

Power is supplied by two Astro Cobalt 035Gs.



Clipper, made the first flight that opened North Atlantic airmail service in 1939. These were exciting, imaginative times.

In reminding us of this time in history, Thayer also manages to make us smile. Powered by two Astro 035Gs and complete with curtains in the windows, his Bee 314 may not make it across the Atlantic, but it sure expresses what is the core of our great hobby ... imagination. †



The finery awaiting 1930s passengers was most elegant. The same seems true when catching a Bee 314 flight, as evidenced by the lace window curtains.

Low-drag control-surface controls are necessary for good fuel economy.

important than knowledge.”—Albert Einstein

World

Class

Aerobatics

from

Las Vegas

IN A SPORT where we strive to fly our models like full-scale aircraft, it is a known fact that our models just don't have the same feel as full-size planes. When you watch a model fly, you know it's a model; that is, until now. In the contest that brings together the top aerobatics pilots from around the world, we see models virtually duplicate the grace and high-power performance of the real thing. This is the essence of the Tournament of Champions.

Steve Stricker and wife Pat pose with Steve's winning 43.7-percent-scale Extra 300S; 129-inch span; 50 pounds; 3W-160, 4-cylinder engine with Menz 30x12 prop.



13th International Tour

by MIKE LEE

Just a few of the spectators who were on hand to witness the best of the best.



In this 13th edition of the Tournament of Champions, 20 champion pilots are pitted against one another in the ultimate aerobatics competition. The planes they fly are unique in modeling. When the TOC originated 23 years ago, the pilots flew state-of-the-art pattern aircraft, performing a duplication of the World Pattern Championships. As the TOC evolved, the format changed such that the pilots were soon flying preci-

Thirteenth-place Peter Erang flew a Wiggen Z-250 (shown here coming in for a smooth landing). The Wiggen has an 118-inch span and is powered by a 3W 120 turning a 28x14 prop.





Steve Rojecki, Steve Stricker and Miss TOC, Anna Chudoba, show Stricker's winnings (\$30,000) and a trophy for being the best.

ment of Champions

sion aerobatics based on the flight sequences flown by full-scale aerobatics pilots. As the flying format changed, so did the planes. Bonuses for scale reproduction, size and design became the incentive to build the incredible aircraft we see today. The circle is now complete, with scale aircraft almost half the size of their full-scale cousins performing the maneuver sequence and being judged by full-scale as well as by

model aircraft judges.

What's new for this edition of the TOC? Now that the circle has been completed, the bonuses allowed for multiwing aircraft have been eliminated. Biplanes and monoplanes were on equal footing, as the scores were determined strictly on performance of the maneuvers. In fact, only one biplane entered the field: a 42-percent-size Ultimate biplane flown by Mike Klein of the

United States. All other contestants flew modern-day monoplane replicas of the Extra 300, Giles G-200 and CAP 232. Again, as in past TOC events, the pilots are required to fly a "Known" maneuver sequence, an "Unknown" maneuver sequence and the spectacular "Freestyle" sequence. Three days of preliminary rounds were scheduled, with one day of final elimination for the top five pilots.



It's the real thing: Patty Wagstaff flies her Extra 300 in front of the crowds as part of the midday show. Patty showed everyone what extreme, hardcore aerobatics is all about.



PHOTOS BY MIKE LEE



Second-place winner Quique Somenzini poses with his 37-percent-scale Extra 300L. Quique is the one who introduced us to 3D aerobatics in 1994.



Fifth-place Bill Cunningham props his 3W 120-powered, 46-percent-scale Giles G-200. An APC 26x12 prop hauled his 36-pound, 110-inch-span model around with style.

Top 5
Finalists'
Scores

NAME/COUNTRY	KNOWN 1	KNOWN 2	UNKNOWN 1	UNKNOWN 2	4-MIN FREE. 1	4-MIN FREE. 2	TOTAL
Stricker, Steve/USA	24,813.750	24,958.269	41,126.786	1,604.17	16,345	17,510	83,595.066
Somenzi, Quique/Argentina	24,065.192	22,862.308	40,511.310	41,272.19	17,550	17,520	82,972.81
Shulman, Jason/USA	20,522.308	24,499.904	0.000	38,944.643	14,285	16,760	80,204.55
Paysant-LeRoux, Chris/France	23,368.558	24,627.981	33,408.333	37,451.786	17,635	17,880	78,959.77
Cunningham, Bill/USA	24,324.808	24,383.942	37,645.238	37,019.643	16,530	17,300	79,329.18

This year, results were determined by survival of the fittest. Very tough weather conditions prevailed throughout the contest, and for only the third time in 23 years, an entire day of flying was canceled due to bad weather. The second day of flying was marred by high winds coming directly across the runway. With gusts hitting 45mph, even the famous guest tent was torn clean out of the ground and rolled up into a ball of debris. Contest director Steve Rojecki wisely canceled the day and no doubt saved at least a couple of these \$5,000 aircraft from certain destruction. The poor weather continued the next day, but at a diminished intensity, allowing the competition to pick up on day three.

Coming out of round one, the Known flight sequence, Steve Stricker was leading the field, followed by defending champion



Craig Hodgkins, president and general manager of the Sahara, unveils a painting given to Bill Bennett and signed by the TOC pilots. The painting is of an F4F Wildcat of the type flown by Bennett during World War II.

Quique Somenzini (both veteran TOC pilots who have faced off several times before). In third was French pilot Christophe Paysant-LeRoux, followed by young Jason Shulman and tough guy Bill Cunningham. Interestingly, Christophe's brother Benoit was also flying in the event, making them

the first brothers to be invited to fly.

Round two was another edition of the Known sequence, and Stricker simply turned up the heat on the field. His flight smoked everyone. Bill Cunningham was paying attention, and he launched to a second place score in this round, followed by Somenzini (Argentina) and Peter Erang (Germany). Dave Von Linsowe hit a high note by taking fifth.

In the final round for day one, an Unknown sequence was flown, and the showman Quique Somenzini showed the way. Shulman kept pace, with Cunningham and Stricker following. Christophe Paysant-LeRoux was in fifth. You could tell already what the course of this contest was heading for. But it ain't over yet.

Preparing for a competition that differs



Steve Stricker shadow-flies with the help of his caller, Paul Kirsch. Like many full-size aerobatic pilots, most TOC pilots use a small model on a stick to visualize the maneuvers they'll be flying.

For years, the aircraft flown at the Tournament of Champions have greatly influenced the overall sport of R/C. Here are the 1996 TOC aircraft requirements.

Aircraft Specifications

Type of Aircraft

Model aircraft shall be a replica of an actual full-size aircraft designed for aerobatic maneuvers. Suitable military aircraft will also be accepted. It is the responsibility of the contestant to document both the aerobatic capacity and the proof of scale of the full-size aircraft chosen. Contestants must provide 3-view scale drawings of both the original aircraft they selected and their version of the aircraft. Deviation from scale should be noted to aid contest officials.

Deviation from Scale

- The top and side outline dimensions of the model shall be within a 10 percent deviation from scale.
- The scale of the model shall be determined by the model's wingspan (top wing for biplanes) as compared to the full-size aircraft.
- General contours and shapes of the models shall be similar to the full-size aircraft.
- The model's airfoil does not have to be the same as the full-size aircraft's airfoil.

- Control-surface hinge locations and types can be different from those of the full-size aircraft.
- Additional controls and flight control surfaces cannot be used on the model unless the full-size aircraft had such controls or control surfaces.
- Any type of radio control equipment can be used.

Engine Specs

Maximum engine displacement will be based on wing area:

Up to: 2,200 sq. in. = 5.8ci max.

3,000 sq. in. = 7.0ci max.

3,500 sq. in. = 10.8ci max.

Greater than 3,500 sq. in. = 12.0ci max.

Aircraft Weight.

There is no weight limit.

Minimum Wing Area

Monoplanes = 1,400 sq. in.

Biplanes = 1,600 sq. in.

Cockpit

The model shall contain a realistic pilot and instrument panel of appropriate size.

greatly from normal pattern flying takes a great deal of preparation and planning. While Kirk Gray had only three months to prepare himself for the TOC (he is the current AMA Champion in F3A), other pilots, like Steve Stricker, had been practicing and preparing for the past two years. Steve says that nobody makes it to this contest alone, and this is evident, as each pilot had a caller he had been working with for an average of nine months or more.

The preparation also includes the building of an aircraft. The rules state specific size and powerplant combinations that are allowed to compete. And while you could take a plane that had flown in a previous TOC, you could make a more powerful aircraft to fly as well. In my interviews with the

pilots, I found none had taken the aircraft specifications to the limits of power and size. They found enough power available without hitting the stops. The smallest aircraft flown was entered by Jason Shulman, this being a 35 percent Extra 260. Steve Stricker flew the heaviest ship—a 44 percent Extra 300S weighing in at 50 pounds. His aircraft matched the wingspan of Geoff Combs' Extra 300S with 129 inches, making these birds the largest of the bunch.

With day two being lost to high winds, day three dawned with clear skies and a light breeze. Round two of the Unknown sequence was flown first. As the flight order of the pilots was determined by random drawing and then rotated throughout the contest, the first pilots up on day three had Christmas handed to them. The last pilots in this round were cursed with increasing wind speed that hampered flight precision. Despite the winds, Steve Stricker showed

the field how to fly. Again, he scored tops in the round, followed by Somenzini, Mike McConville of the U.S., Benoit Paysant-LeRoux of France and his brother Christophe in fifth.

The winds picked up so much speed that Mike Klein, flying a borrowed Ultimate biplane from Chip Hyde, wisely decided not to risk someone else's plane and dropped the round. Another pilot, Dave Patrick of Canada, had the weirdest equipment failure of the day. His plane operated flawlessly, but the neck strap on his transmitter tray failed, preventing Dave from getting the plane safely airborne.

Somenzini hovers his 34-pound bird during the Freestyle event.



Fourth-place Christophe Paysant-LeRoux with his Team 7.0-powered, 37-percent-scale CAP 232.

Championship Hardware

Here's a short list of aircraft and equipment from the 13th TOC.

AIRCRAFT	ENGINES
7 Extra 300S	10 3W 120
3 CAP 232	3 3W 160
3 Giles G-200	(4 cyl.)
2 Extra 260	2 3W 80
1 Extra 300L	2 Team 7.0 ci
1 Giles G-202	1 3W 70
1 Wigen Z-250	1 A3
1 Ultimate Biplane	1 4.2ci
1 Sukhol Su 26 MX	
PROPELLERS	RADIOS
9 Menz	16 Futaba
5 Bolly	3 JR
2 APC	1 Airtronics
4 Unknown	

FREESTYLE

Now, this is the most awesome part of the competition. In Freestyle, each pilot is allowed 4 minutes to perform any flight sequence he pleases, except anything dangerous or coming close to the spectators (dangerous includes pyrotechnics). It was only a couple of years ago that Dave Von Linsowe introduced freestyle flying to music. This time, every

TOC Pilots and their Aircraft

Place	Name/Country	Aircraft	Span (in.)	Wt.	Engine	Prop	Radio
1	Stricker, Steve/USA	43.7% Extra 300s	128"	50 lb.	3W-160	Menz 30x12	Futaba
2	Somenzini, Quique/Argentina	37% Extra 300L	116.5"	—	3W-120,	—	Futaba
3	Shulman, Jason/USA	35% Extra 260	102"	23 lb.	3W-80	Menz 26x10	Futaba
4	Paysant Le-Roux, Chris/France	37% CAP 232	108"	15kg	Team 7.0	Menz 28x12	Futaba
5	Cunningham, Bill/USA	46% G-200	110"	36 lb.	3Ww-120	APC 26x12	Futaba
6	von Linsowe, Dave/USA	35% Ex 260	102"	21 lb.	4.2	24x10	Futaba
7	McConville, Mike/USA	42% G-202	110"	35 lb.	3W-120	Bolly 30x12	Futaba
8	Naruke, Gichi/Japan	37% Extra 300s	109"	16kg	3W-120	Bolly 28x14	Futaba
9	Paysant-LeRoux, Benoit/France	37% CAP 232	108"	15kg	Team 7.0	Menz 28x12	Futaba
10	Kristensen, Ivan/Canada	46% G-200	110"	38 lb.	3W-120	Menz 30x10	Futaba
11	Matt, Wolfgang/Liechtenstein	37% Extra 300s	109"	17kg	3w-70	Bolly 30x12	Futaba
12	Patrick, Dave/Canada	42% CAP 232	111"	39 lb.	3w-120	Menz 28x10	Futaba
13	Erang, Peter/Germany	48% Wigen Z-250	118"	17kg	3w-120	28x14	Futaba
14	Koger, Dean/USA	46% G-200	110"	37kg	3W-120	APC 26x12	JR
15	Gray, Kirk	35% Extra 300s	103"	26 lb.	3W-80	Menz 26x10	Futaba
16	Combs, Geoffrey W./USA	44% Extra 300s	129"	47 lb.	3W-160	Menz 30x12	Airtronics
17	Hatt, Hajime/Japan	37% Extra 300s	109"	15kg	3W-120	Bolly 30x12	JR
18	Akiba, Yoichiro/Japan	37% Extra 300s	108"	16kg	3W-120	Bolly 28x12	Futaba
19	Lakin, Chris/USA	40% Su 26 BIPE	122"	41 lb.	A3	30x10	JR
20	Klein, Mike/USA	42% Ultimate	98"	38 lb.	3W-160	Menz 32x10	Futaba



What is this man doing? Dave Von Linsowe holds the transmitter behind his back while performing half of his Freestyle sequence. What a showman!

13TH INTERNATIONAL TOURNAMENT OF CHAMPIONS

pilot used music to enhance the flight. Judges were to determine the overall flight score by originality, versatility, execution and harmony and rhythm. I must say that some pilots really coordinated their flight maneuvers to the music quite well. But the real excitement had to do with versatility and originality.

I can't describe to you every flight by every pilot, but I can tell you about some of the incredible (for lack of a better word) stunts. Chip Hyde showed us the torque roll four years ago. Now, everyone does this. But can you do a 4-point torque roll? Steve Stricker did, as well as knife-edge loops, low-level hovering and 6-foot tail-chasing loops. Yes, the plane rotated about its nose. Christophe Paysant-LeRoux showed how to take a 35-pound plane and make it dance on top of the shrubs ... including wingtip pirouettes. Somenzini gave a graphic demonstration of how to hover in one spot at 2 feet above the deck with his 32-pound Extra 300L. Both Ivan Kristensen and Dave Von Linsow used long streamers to enhance the flight, but Dave released his in flight and then turned on the smoke. And one incredible moment later, Dave proceeded to perform the sequence with the transmitter held behind his back!

With two rounds of this entertaining and daring flying over with, the die was cast to determine the top five pilots who would head into the final rounds. All flight scores were tallied, with no throw-out scores allowed in the preliminaries. The scores were held secret until the evening, when the TOC banquet was held at the Sahara Hotel and Casino.

MR. TOC

Bill Bennett, co-founder and main backer of the TOC since day one, graciously provided the Grand Ballroom of the Sahara to be the backdrop for the banquet. He also hosted all the pilots and crews during their stay. Bill and the late Walt Schroder of *Model Airplane News* saw the vision of advanced model aerobatics come true with the TOC. Bill is also an avid modeler, and being a diehard R/C plane fan, he used his own personal funds to develop the TOC flying field, which is used year-round by a host club. Although Bill wasn't able to preside over the festivities, Craig Hodgkins, president and general manager of the Sahara, filled in for the night.

At the banquet, competing pilots were informed of their standings in the preliminaries by a presentation of their trophies and awards. Twentieth place is granted an award of \$4,000, plus a plaque, signifying his accomplishments. When it came down to the final five, only the names were called, as these would be the pilots who would continue forward for the top prize in the finals. Without knowing which actual place they were in, Bill Cunningham, Christophe Paysant-LeRoux, Jason Shulman, Quique Somenzini and Steve Stricker received the call to fly again.

Three Americans, one Argentinean and one Frenchman were going to fly their tails off for a first-place prize of \$30,000!

THE FINAL

Sunday dawned cold and blustery. With a totally new Unknown flight sequence to fly, we would see who could handle wind, the cold and the unknown. Jason Shulman failed to make it to the field on time and lost his first flight. Meanwhile, Steve Stricker showed the world he could fly in any weather. His plane was solid and crisp in the wind, as his control inputs maintained near perfect

Flying at TOC

At the TOC, pilots fly in three separate programs of the competition. These are the Known Compulsory, the Unknown Compulsory and the Four Minute Freestyle programs. For the Known and Unknown programs, maneuvers are based on the 1989 FAI aerobatic catalog.

HERE IS THE KNOWN PROGRAM

1. Enter the box level, upright. Push to vertical down-line and perform $1\frac{3}{4}$ positive-G snap rolls. Pull to level, cross-box. Exit upright.

2. From upright, cross-box, perform 3 of 4 rolls (270 degrees) of a rolling circle (first roll outward, second roll inward, third roll outward). Exit upright.

3. From upright, pull to a vertical up-line and perform 3 points of a 4-point roll, followed by a stall turn. On the vertical down-line perform a $1\frac{1}{4}$ negative-G snap roll. Pull to level and exit upright.

4. From upright, pull to a vertical up-line and perform a stick-forward (wheels up) tail-slide. Push to level and exit inverted.

5. From inverted, perform a $1\frac{1}{4}$ positive-G snap roll to knife-edge, followed by a $1\frac{1}{4}$ aileron roll in the opposite direction. Exit inverted.

6. From inverted, push to a vertical up-line and perform a $\frac{3}{4}$ positive-G snap roll. Push to level, inverted, cross-box. Exit inverted.

7. From inverted, cross-box, pull to

vertical down-line and perform 8 points of an 8-point roll. Push to level and exit inverted.

8. From inverted, perform an outside Cuban-8. On the first 45-degree down-line, perform a $1\frac{1}{2}$ positive-G snap roll. On the second 45-degree down-line, perform a $1\frac{1}{2}$ negative-G snap roll. Exit inverted.

9. From inverted, push to a vertical up-line and perform 3 points of a 2-point roll. Perform a $\frac{1}{2}$ outside loop (humpty-bump). On the vertical down-line, perform a positive-G snap roll followed immediately by a second positive-G snap roll in the opposite direction. Push to level and exit inverted.

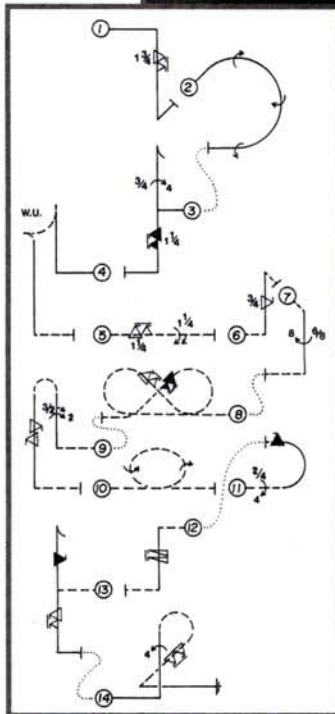
10. From inverted, perform a 360-degree 2-turn rolling circle. First roll outward, second roll inward. Exit inverted.

11. From inverted, perform 2 points of a 4-point roll followed immediately by $\frac{1}{2}$ inside loop (Immelmann). At the top of the loop, perform one negative-G snap roll. Exit inverted.

12. From inverted, perform a 2-turn positive-G (cross-over) spin. Push to level and exit inverted.

13. From inverted, push to a vertical up-line and perform a negative-G snap roll followed by a stall turn. On the vertical down-line, perform a $1\frac{1}{2}$ positive-G snap roll. Pull to level and exit upright.

14. From upright, pull to a vertical up-line and perform a 4-point roll followed by $\frac{5}{8}$ of an outside loop to a 45 degree inverted down-line. On the 45 degree down-line, perform 2 consecutive positive-G snap rolls. Pull through 90 degrees to level. Exit upright.



position in the maneuver box. Somenzini captured the next higher score, followed by Cunningham and Paysant-LeRoux. In round two, problems migrated to the Stricker pits, as his ship flamed out in flight just after beginning the first maneuver. That let Somenzini dominate the sky, with Shulman fighting back in second, Christophe Paysant-LeRoux in third and Cunningham in fourth.

Round three was very bad for Jason Shulman. For the first time in TOC history, pilot error resulted in the loss of a plane. As Shulman performed the first of two Freestyle flights, his Extra 260 was lost in a low-level

stunt. Paysant-LeRoux took the reins and wowed the judges with his seemingly weightless plane. Second went to Somenzini with the most daring hovering stunts, third to Cunningham and fourth to Stricker.

With the final round now on—



Sixth-place Dave Von Linsowe poses with his 35-percent-scale Extra 260; 4.2ci for power turning a 24x10 prop.

The 1996 Tournament of Champions is in the record books, and I am very happy to have been part of this incredible event. This was my third time as a TOC competitor. Each TOC I have attended seems to push the limits of models and pilots to new levels. This year's event marked a few exciting new trends in the world of RC aerobatics.

by Mike McConville

The first was in the airplane designs. Along with the usual Extras 280s, 300Ss, 300Ls and Cap 232s, which are all fantastic flying designs, the new Giles G-200 and two-place G-202 designs made their debut to model competition and were very well-received. Three G-200s and one G-202 (mine) were being flown. Dave von Linsowe also had a G-202 but lost it due to radio failure the day prior to the competition. The unique swept-wing leading edge really made these planes present well and set them apart from the rest of the field. I began development of my 42-percent G-202 and the 27 percent version I designed for Midwest as soon as I saw the full-scale prototype in 1995. A pair of identical 42-percent scale models were built by my very good friend and master builder Dan Vermeulen. I was extremely pleased with the pair of finished models and must say they are the best flying aerobatic models I have ever flown, bar none! I chose the G-202 over the G-200 because the 202 has a longer fuselage and performs better than the shorter G-200. In talking to fellow competitors I found two others who, like me, are designing a 2-meter size G-202 for F3A pattern competition next season.

The second trend is the use of gyros on one, two and even all three control axes. With the introduction of piezo gyro technology, gyros are now becoming practical for use in model airplanes as well as helicopters. The gyros can stabilize the model and make some maneuvers such as snap exits much more precise. While there are benefits, and many pilots did use gyros, they were not mandatory. I experimented with gyros but opted not to use them in my planes because of problems with small shifts in the servo's neutral. However, with the introduction of new gyros such as the JR® NEJ-3000 piezo gyro, the problems of the first-generation gyros have been eliminated. I think we'll see gyros used much more in R/C airplanes in the near future.

But the most exciting trend was in the types of maneuvers flown in Freestyle. At the 1994 TOC, Quique Somenzini amazed the world with the introduction of maneuvers that seemed to defy aerodynamics. They seemed to be magic, as the airplane was doing things such as flat, elevator-like vertical descents, end-over-end flips or "waterfalls," and many hovering maneuvers that didn't seem possible. We were seeing the birth of 3D Aerobatics.

I worked very hard to figure out these 3D tricks and finally designed what I thought was required to fly the maneuvers into my G-202. This year's Freestyle event had a few of us doing 3D maneuvers in our routines. Quique, of course, as well as Christophe Paysant-LeRoux and I all incorporated 3D maneuvers. I was very pleased to find that after months of work and studying videos of Quique's 1994 freestyle routine, I had beaten him in the first round of Freestyle competition, though I thought his flight was very good.

Interestingly, the one criticism of 3D flying I did hear was that this style of flying does not resemble full-scale aerobatics. While this is undeniably true, I found it very ironic that in conversations with Patty Wagstaff, I found she is very interested in what we are doing in R/C and wants to figure out how to do some of these maneuvers in her full-scale Extra 300S. One thing is for sure: 3D aerobatics are here and bring an entirely new and exciting dimension to aerobatic flying.



Patty Wagstaff flashes a big thumbs-up for Mike McConville's Giles G202.

Trends at TOC

another Freestyle flight—Shulman showed why he was there. He brought out his backup Extra and continued the competition. That's real guts! Paysant-LeRoux again took the round, followed by Somenzini, Stricker, Cunningham and Shulman. The only thing left was a tally of scores.

Now, you would think that after missing a round and losing another to a crash, Shulman didn't stand a chance. You might also think that with Stricker dropping a round due to engine failure, his hopes of taking first might have been dashed.

However, each pilot is allowed one throw-away round in each category of flight. With that in mind, the new TOC champion became Steve Stricker, followed by Quique Somenzini in second, Jason Shulman in third, Christophe Paysant-LeRoux in fourth and Bill Cunningham in fifth.

Stricker was definitely the master of the weather this year. Despite the larger size of his ship, his control showed pure finesse and skill. His Extra 300S was one of only two ships powered by a 4-cylinder powerplant and aided by gyros on pitch and yaw controls. Many pilots utilized gyros to help stabilize the big birds. Somenzini and Paysant-LeRoux did not use them. Virtually all the pilots used computerized radios with separate control programs for performing the Aresti maneuvers and for the Freestyle maneuvers.

You cannot find this much talent and skill in the same place anywhere else on the planet. The pilots and crews go beyond amateur modeling; they're professionals. But there is only one way to prove this. Be at the next TOC in 1998. Thanks, Bill!

*Addresses are listed alphabetically in the Index of Manufacturers on page 123.

Scale **TECHNIQUES**

by **GEORGE LEU**

STRONG, SCALE, CONTROL SURFACES

I HAVE often heard people comment on delicate-looking, control-surface structures such as fabric-covered elevators or rudders on scale models. Aren't those surfaces weak points on the model and prone to breaking and hangar rash? While I admit that the tail structures of many scale models appear "flimsy," in reality, it is what's inside, underneath the covering, that counts.

DELICATE TAIL FEATHERS

Many full-size, fabric-covered rudders and elevators are made of lightweight,

formed-aluminum ribs and have small, formed-sheet-metal leading edges. What's needed for our scale models is a structure that's strong and shows delicate details when covered with fabric. This technique is also a natural for fabric-covered ailerons and flaps.

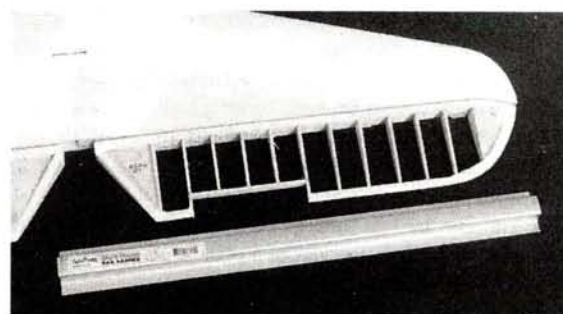
I have used this technique on many WW II aircraft, and I'm currently incorporating it into a new original-design Messerschmitt Bf-110 I'm working on. Oh yeah; it's also a lot easier to build stuff with this technique than using a traditional built-up, stick structure.

First, I cut a full-size outline (core) of the part from $\frac{1}{16}$ -inch thick balsa sheet. I then pin it over the plans and add a balsa leading edge. In the case of the Bf-110, I used a $\frac{1}{4} \times \frac{1}{2}$ -inch piece of balsa. (The $\frac{1}{2}$ -inch dimension

runs from the LE toward the TE.) I then marked off the rib locations and glued $\frac{1}{4} \times \frac{1}{8}$ -inch balsa ribs to the aft edge of the LE and to the $\frac{1}{16}$ -inch-sheet core.

When the glue was dry, I used a pencil and marked the shape of the delicate structure of the metal LE. I then cut along these lines with a sharp hobby knife to a depth of about $\frac{1}{8}$ inch. I then cut into the aft edge of the LE and removed the wood from between the ribs. When this had been done, I removed the structure from the plans and duplicated the process on the other side of the rudder. After sanding the ribs to a tapered airfoil shape and rounding the LE, the final structure is very tough and much stronger than a typical built up structure.

The final step is to highlight the structure after the part has been covered. To accomplish this, cover and

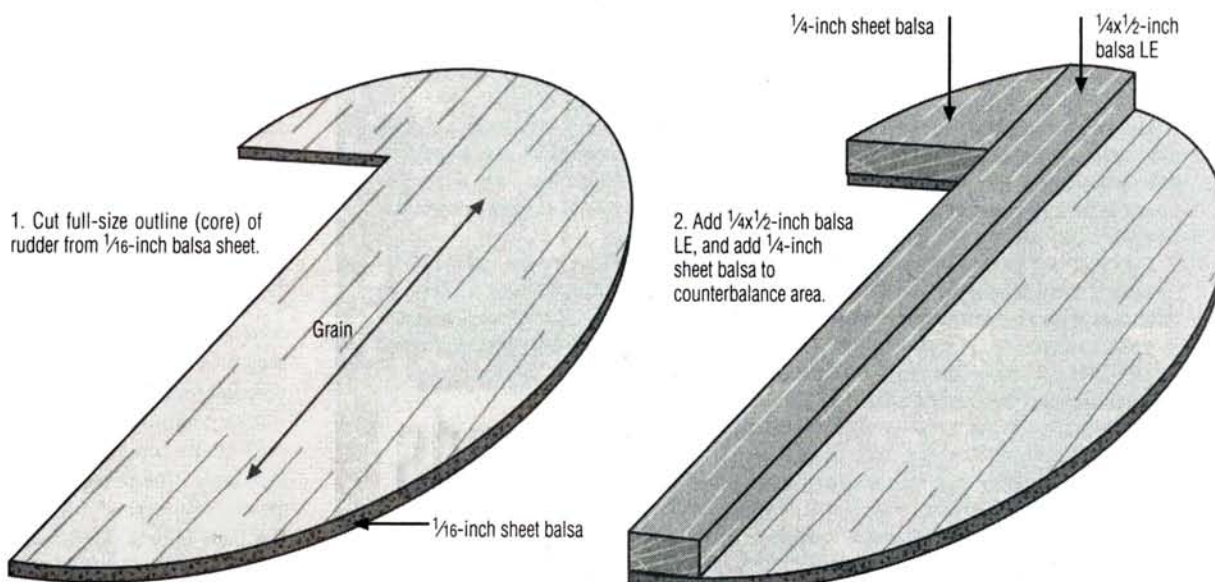


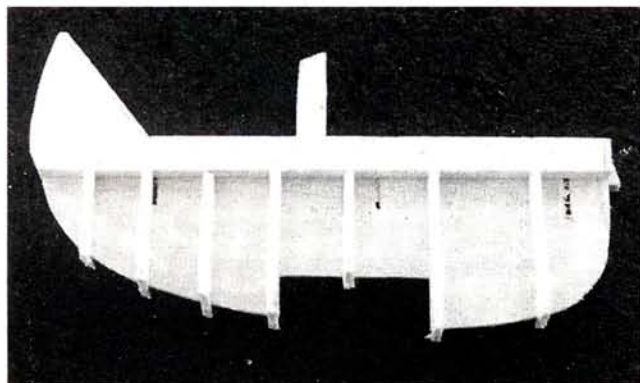
To sand a surface smooth and straight, you need a long sanding bar. Great Planes' Easy Touch sanding bar is an extruded-aluminum tool that makes sanding a pleasure.

PHOTOS BY GEORGE LEU

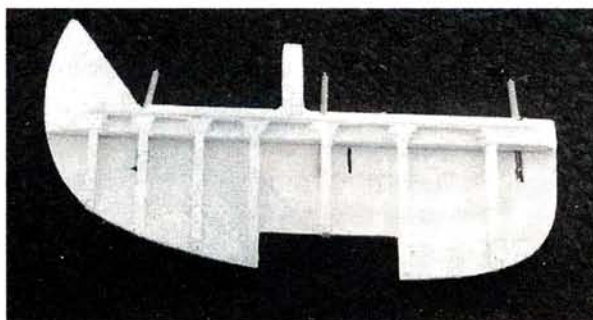


The Easy Touch sanding bar is available in three sizes and has rolls of stick-on sandpaper strips available in different grit sizes.





This Bf-110 rudder is ready to be sanded to shape. Note that the LE has not yet been cut to shape.



After cutting the material away from the LE between the ribs and sanding the whole control surface to an airfoil shape, you're ready to cover the rudder. Note that the hinges have been temporarily installed. They will be glued into place after the covering has been applied.

paint the control surface with your favorite materials, then weather the finish with a final sanding using 600-grit sandpaper. The pressure of the sandpaper over the edges of the LE and ribs highlights the underlying structure by removing paint from the surface and exposing underlying primer. Adding a bit of powdered pencil graphite will also highlight and define the underlying structure. It's really very easy to do.

You can employ this technique on any scale model you are building (kit or scratch). Try it on a Top Flite* F4U Corsair or just practice the technique on one of your sport models. It really yields an impressive result.

GREAT PLANES BAR SANDERS

I recently started using Great Planes* Easy Touch bar sanders, and I want to

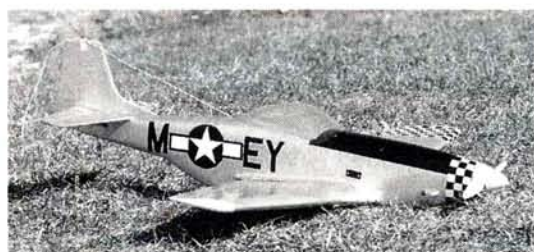
tell you they're fantastic for working on models of all types and sizes. The bar sanders come in 22-inch, 11-inch and 5½-inch sizes, and there's a variety of sandpaper grit sizes available to use with them. The sandpaper comes with an adhesive backing. Perhaps the biggest innovation these sanders offer is their ergonomic design. They are downright comfortable to use. If you're comfortable, you won't rush a project; you'll do the job correctly.

HIGH-TECH FUN

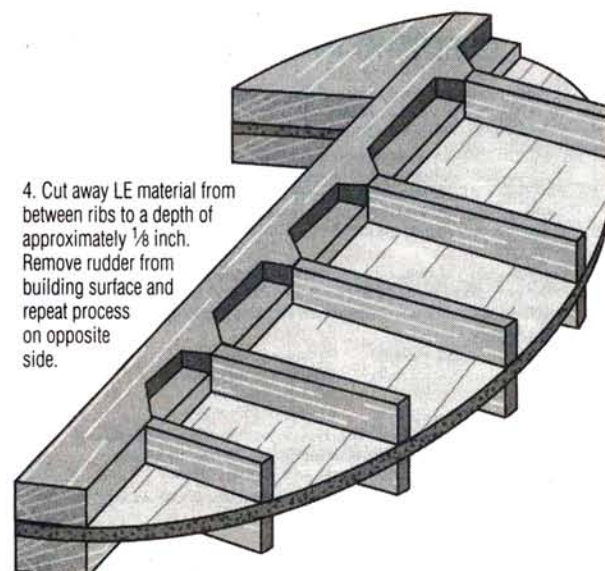
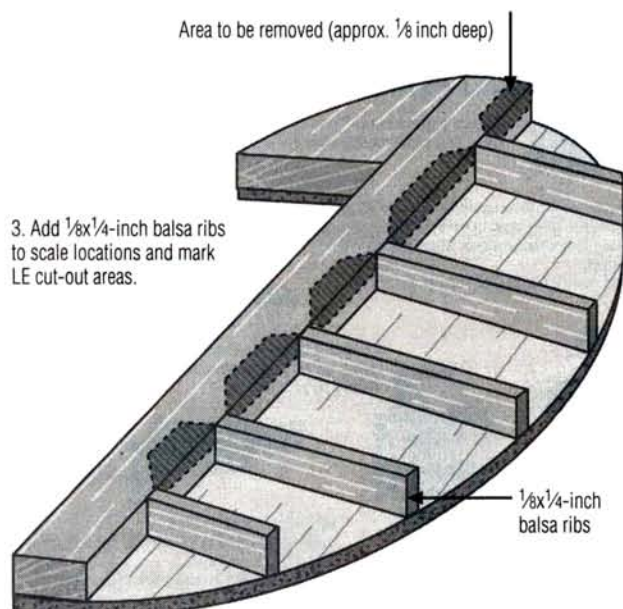
I recently went up to Connecticut and spent the day flying with friend and editor Gerry Yarrish and a few notable scale design-

ers, one being Eric Mey. Eric runs Mey's Hi Tech Hobby* and is well-known for his A-6 Intruder design, which he flew at the World Championships. Eric allowed me to fly one of his designs—the "Combat Series" 1/12-scale P-51 Mustang.

While this Mustang has no landing gear and requires hand-launching, it



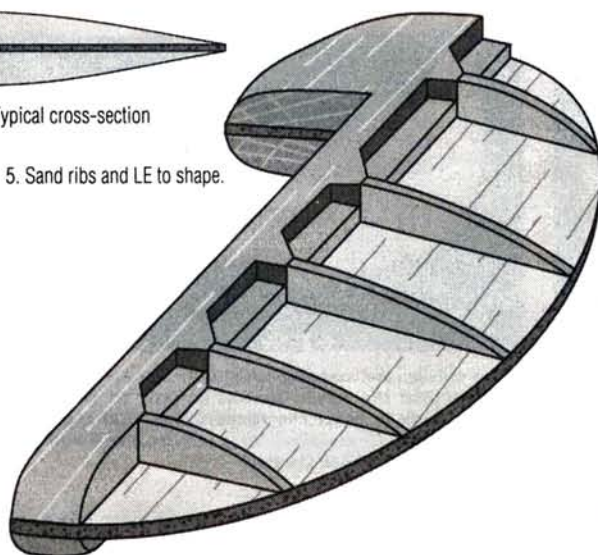
This neat .15-powered 1/12-scale P-51 Mustang is a great little performer. Available from Mey's Hi Tech Hobby, the model can also be powered with an electric motor.



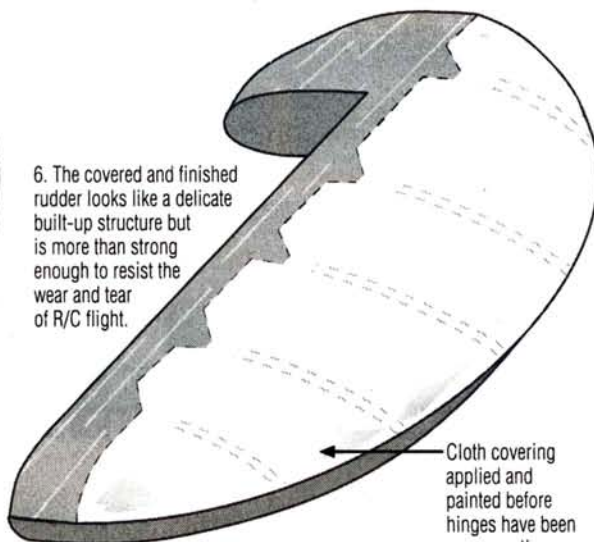


Typical cross-section

5. Sand ribs and LE to shape.

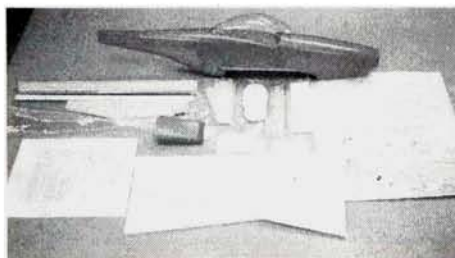


6. The covered and finished rudder looks like a delicate built-up structure but is more than strong enough to resist the wear and tear of R/C flight.



Cloth covering applied and painted before hinges have been permanently installed.

flew with great authority on a .15 glow engine. I initially thought its 36-inch wingspan would make the Mustang difficult to see, especially at the high speed



There aren't many pieces in the Mey's P-51 kit, and it can be built very quickly. It is a very light, rugged design.

it flew. I was wrong. I performed a variety of maneuvers and, even without rudder, they were recognizable. The Mustang glides quite nicely when the fuel has gone, and I found its overall performance impressive.

The kit is easy to build and comes with a fiberglass fuselage, foam wing, balsa stab, elevator and rudder, a clear canopy and instructions. You could also build the Mustang as an electric model, but it does fly very nicely with a glow engine. Eric and I figure a set of retracts could be installed without too much trouble, if a scale modeler just had to have

them. I recommend this design as a nice change of pace, and with the variety of other WW II fighters available in the series, a potential "event" could be staged using these neat little warplanes. I must admit the investment in time and money (under \$80) shouldn't be a detriment to having one of these aircraft. Nice going, Eric!

Well that's it for this month, I hear a Bf-110 calling my name from the workshop. We'll talk about that project some other time.

*Addresses are listed alphabetically in the Index of Manufacturers on page 123.

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Turbo-10 Plus Motor: Outrageous power w/excellent run time. Light weight and compact!!

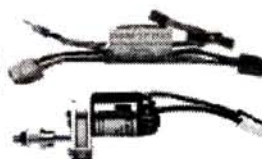
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Dual Box allows 2 turbo motors to fly 7-10 lb models w/ease. Dual Box can be used w/single motor and set up for 7.0:1 - 10.0:1 gear ratios. Can turn 13" - 18" props at low amps.



Turbo 10/20 Brushless Motor: Shocking power on 7-20 cells w/excellent run time. Requires slightly larger models.



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Turbo 10 Plus or GT motor	\$89.50
Superbox 6.0:1	\$42.50
Dual Box 4.3:1, 5.0:1, 6.0:1	\$61.50

DEALER INQUIRIES WELCOME



3-View Documentation for Scale Modelers

The Chipmunk trainer and the modified versions used by airshow pilots have become very popular modeling subjects because of their great flight characteristics and the large variety of available paint schemes.

Top speed—141mph

30th

The WWI dream continues

by Gerry Yarrish

Annual Rhinebeck Jam

FEW MODELING EVENTS mimic so closely their full-size counterparts as does the annual Rhinebeck WW I Jamboree, hosted by the Mid-Hudson R/C Society (MHRCS). This gathering at the world-famous Old Rhinebeck Aerodrome has continued for 30 years and is one of the most popular R/C events in the New England, tri-state area.

The Old Rhinebeck Aerodrome is located approximately 100 miles north of New York City and is on the east bank of the Hudson River. With its annual gathering of WW I models and a huge collection of full-size antique aircraft, the Rhinebeck WW I Jamboree captures the spirit of early aviation.



The grandstands at Rhinebeck are at best rural, but about 2,000 spectators showed up for the weekend fun.

DAILY DOGFIGHTS

The Rhinebeck competition is broken down into four events: Mission, AMA Sport Scale, Free Style and Rhinebeck Maneuvers. These events are flown intermingled from five flight-lines, and pilots from each flight station fly in overlapping airspace. At times, there may be a few close calls, and a landing approach might have to be aborted, but for the most part, things go along without incident. Trees are a big part of the scene, as the Aerodrome was literally hacked out of the woods by its founder Cole Palen. To do well at Rhinebeck, you need to have good depth perception, not be intimidated



Third-place winner in AMA Sport Scale, Vern Nulck scratch-built this Albatros D.Va. Vern painted his model to reproduce Cole Palen's aircraft.

by trees and know how to handle gusty winds. Many New England modelers feel that you just haven't been completely anointed in the arena of competition unless you have earned your wings at Rhinebeck.

The rules for Rhinebeck have been evolving for 30 years and are designed to extract the most fun out of every flight. They're designed to keep the competition challenging and to maintain a WW I flavor. Models entered in any of the four events must be scale models of aircraft built and flown prior to 1939. Models such as Ugly Stiks, Elders, Antics, etc., are not eligible. Aircraft and prototypes of aircraft used in WW II combat situations (not only used for training purposes) are not eligible. Minor changes can be made to the models to enhance flight performance and safety. However, the general shape, finish, color and markings of the

Campy and melodramatic, watching the Rhinebeck show is a great way to relax between morning and afternoon rounds.

prototype aircraft must be maintained. Here's a breakdown of the events.

- **AMA Scale Event no. 513.** At Rhinebeck, R/C Sportsman and Expert Scale are combined and flown together. Besides what's in the AMA Scale rule book, additional optional maneuvers are allowed, including a Vrille (3-turn spin), a Chandelle (climbing 180-degree turn ending in near stall at the top), a strafing run (centered on the target circle

boree

from an extended dive to within 10 to 20 feet of the ground) and a Reversement ($\frac{1}{2}$ Cuban-8). Models entered in the Rhinebeck Maneuvers event are not eligible.

- **Rhinebeck Maneuvers.** This scale event rewards flying skill more than building skill. The maximum total time for this event is 12 minutes, including start time. The following maneuvers are flown in order: takeoff; Immelmann turn; straight flight out; split-S; procedure turn; a low, slow flyby (10 to 20 feet high for 5 seconds minimum); straight flight back; $\frac{1}{2}$ Cuban-8; a roll (axial or barrel); figure-8; 3-turn spin; stall turn; and a spot landing. Scale-

Tom Polapink flew his **Sterling Fokker D-VII** (in **Cole Palen** markings) to a fifth-place finish in **AMA Sport Scale**. The highly modified kit earned a respectable **98.0** static score.



handicap points are also added to the flight score to determine the total score. Models entered in the AMA no. 513 Sport Scale event aren't eligible.

- **Free Style.** Here, the modeler can execute any maneuvers or operations allowed by the AMA safety guidelines. Favorite choices are smoke systems, touch-and-go, banner towing, dropping a parachute or leaflets, ribbon cutting, inverted flight, etc. The score for each flight is based upon technical achievement and/or originality, presentation (maneuvers placement, etc.), flight realism and overall impression. A maxi-



The noontime lineup of models placed down the middle of the runway. This was a good opportunity for the crowd to get a really close look.

mum time of 6 minutes is allowed, including engine start and landing. If the flight is over 6 minutes, 10 points are deducted from the score, and the contestant is politely asked to land. The contestant's final score is the sum of his best two flights.

- **Mission** is a fun-fly type of event, and scale judging is not required. However, documentation of the model's scale authenticity is necessary, e.g., photograph, 3-views, etc., and must be submitted with the model prior to its safety inspection. Mission

comprises three tasks: a bomb drop (you have to supply your own bomb and your model needs to have a release mechanism); three chances for a balloon burst; and a spot landing. Total engine displacement is limited to a maximum of 0.61ci for 2-stroke engines and 1.20ci for 4-stroke engines. A total of 15 flights per day are allowed for each Mission contestant. There are no practice runs allowed during the Mission flights, and a 2-minute time limit is allowed for engine starting. There is a 7-minute limit for each flight.

The Dream Continues

Another good reason for attending the annual Rhinebeck Jamboree is the wonderful collection of aircraft in the museum. A short uphill walk from the flightline, you'll find a number of hangars all built by Cole Palen to house his growing collection of antique aircraft. The dream started when Cole purchased six WW I airplanes from Roosevelt Field in 1951. He restored his first plane—a Curtiss Jenny—in a barn, and in 1956, he started flying his French SPAD XIII.

In 1958, Cole purchased an old farm to convert into a small airport. With his commitment to building and restoring old airplanes, the Old Rhinebeck Aerodrome began. By 1959, Cole had a short but rough runway that enabled him to fly off his property and, after a while, other aircraft enthusiasts began check out Cole's operation. In 1960, the airshows began, and in its earliest years, the crew putting on the show was often larger than the audience. Since his death on December 7, 1993, the Aerodrome and museum continues with the work and dedication of a small group of Cole's closest friends and many volunteers.



Cole Palen lived his passion for antique aircraft, and his dreams of flying these old machines made the Rhinebeck Aerodrome possible.

Flying Airshow Aircraft

Bleriot XI (1909)
Caudron G3 (1913)
Hanriot replica (1910)
Great Lakes Trainer (1931)
Davis DI-W (1929)
Avro 504K (1914)
Fokker Dr.1 Triplane replica (1917)
Fokker D-VII replica (1918)
Curtiss Jenny JN4H
Nieuport XI replica (1915)
Fleet Finch 16B (1942)
Aeronca C3 (1936)
New Standard D-25 (1929)
Taylor 5-2 (1936)

Collection of Static Display Aircraft

Aeromarine Klemm (1930)
Albatros DVa (1917)
Curtiss Fledgling (1929)
Curtiss-Wright Jr. (1931)
Fairchild 24 (1937)
New Standard D-25 (1929)
Nieuport Model 2N (1911)
Pittsford Mailwing PA6 (1929)
Sopwith Camel (1917)
Sopwith Dolphin (1918)
currently disassembled for restoration
Rinek-Voisin (1908), one of the oldest aircraft in the U.S.
American Eagle (1929)
Fokker Dr.I with a 100hp Gnome Rotary engine (flown by Cole Palen for more than 20 years)
Chanute Glider (1905)
Wright Vin Fit (1911)
Short S-29 with original ENV engine (1910)
Deperdussin (1913)
Wright brothers glider (1902)
Bleriot XI (1911) Bergdoll Bros., with Anzani 3-cycle engine
Bleriot XI (1911) American Aeroplane Supply House, X/C Bleriot, 70hp Gnome engine
Passett ornithopter (1910)
Nieuport 10, original (1915)
Pidgeon Frazer (1917)
Siemens Shukert D-III (1918)
Thomas Morse S4B (1917)
Morane N monoplane (1915)
D.H. PussMoth (1931), currently disassembled
Morane Saulnier AI (1918)
Waco 10 (1928)
Spartan C-3 (1929)
Bird CK (1931)
Nicholas Beazley NB8G (1931)
Monocoupe 90 (1930)
Primary glider (1927)
Vellie Monocoupe 113 (1930)

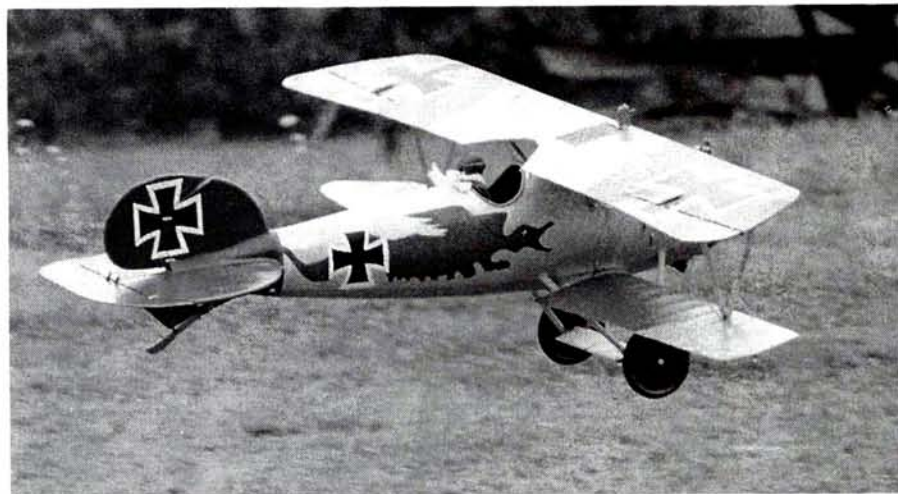


Every weekend between June 15 and October 15, the Aerodrome shows and flies its collection of wonderful antique aircraft.

Pilots are assigned their places on the various flightlines according to their transmitter frequency. There is a ready box for each flight station, and there's a standby line of competitors usually 7 to 10 deep, so flight slots are filled very quickly. By far the most popular event at Rhinebeck, Mission had a total of 551 flights flown!

MIDDAY AIRSHOW

The model competition is halted each day from 2 to 4 p.m. so the Aerodrome can put on its full-size airshow, which features many of the antique aircraft from the museum's collection. What a great opportunity modelers have to see how a real WW I fighter plane actually flew. If any



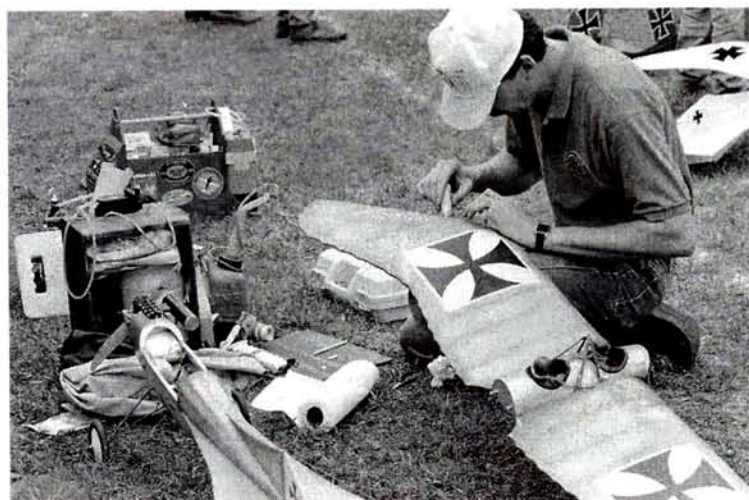
Tom Kosewski of Berlin, MA, placed fourth in AMA Sport Scale with his beautiful Proctor Albatros. The precision scale fighter is powered by a Zenoah G-38 and weighs 22½ pounds. The model's markings are of an aircraft in the Champlain Fighter Museum in Mesa, AZ, and are done entirely in dope.

The majority of the pilots were veterans of past Jamborees, and some came from as far away as Canada and Texas. Once you fly at Rhinebeck, you're hooked.

Because it was raining so heavily everywhere in the New England area (except at the Aerodrome), many people stayed home for fear of getting rained out. Even with the lower number of entrants (109), the total number of flights for the weekend was an astonishing 758! This is made possible by the tremendous effort put out by the club members and the effective way they managed the flightline. The MHRCS has this event down to a science.

of the contestants had a complaint about the small size of the flying area for their models, they quickly changed their opinion when they saw these full-size machines take off and land. Also adding much to the weekend's flavor are the campy and melodramatic trials of Trudy Truelove, and the evil Black Baron and noble Sir Percy Goodfellow, who battle for her affections. Old cars and motorcycles drive around while tanks and cannons let loose and antique airplanes drop bombs. In the end, the Black Baron is blown up by Ms. Truelove. Oops! I just gave away the ending—sorry!

Contributor Dave Baron does some field repairs to his Taube after a typical flight in the Mission event.



Rhinebeck Scores

MISSION

POS. & PILOT	PLANE
1 Dan Droppo	Taube
2 Brian Hoffman	Taube
3 Bill Buckwalter	Taube
4 Dan Luchaco	Eindecker E-III
5 Nick Zirolli Jr.	Taube

AMA NO. 513 SPORT SCALE

1 Jean Chevalier	Travel Air Mystery Ship
2 Bill Setzler	1/3-scale J-3 Cub
3 Vern Nulk	Albatros DVa
4 Tom Kosewski	Albatros DVa
5 Tom Polapink	Fokker D-VII

FREE STYLE

1 Bill Steffes	Great Lakes Special
2 Mike Loebbaka	Sopwith Pup
3 Barry Couchman	Sopwith Pup
4 Ron Gagner	Sopwith Pup
5 Bill Killam	Fokker D-VIII

RHINEBECK MANEUVERS

1 Bob Brodeur	Eindecker
2 Bob Mackey	Junkers J-10
3 Bob Curry	Dr.I Triplane
4 Ken Hall	Heath Baby Bullet
5 Dennis Hernandez	Junkers CL-1

FLIGHT DATA

NO. OF FLIGHTS	EVENT
551	Mission
61	513 Sport Scale
84	Rhinebeck Maneuvers
62	Free Style
758	Total

The top three in each category were awarded Rhinebeck plaques and prizes. Prizes were also awarded to the fourth- and fifth-place finishers.

How the Jamboree Began

Since I was the contest director for the first Jamboree (Saturday, September 23, 1967), I have frequently been asked how it all began. This is that history.

In the fall of 1966, I was living in Poughkeepsie, NY. Three of my friends from the Aero Guidance Society (AGS), Byron Lichtenwalner, Bob Noll, and Bill Underkofler, stopped by to see me after having just attended a WW I airshow at the Rhinebeck Aerodrome. They were excited about the show and thought it would be a really neat idea to have an R/C contest there for scale models of WW I aircraft. We brainstormed the idea at great length.

At the next meeting of my club, the IBM R/C Model Club of Poughkeepsie (now the Mid-Hudson R/C Society), I proposed that the club sponsor an R/C meet at the Aerodrome. While there were some negative comments regarding the fact that the club had never sponsored any sort of contest before, the general reaction was positive, providing we could get the Aerodrome's support.

CD Dick Allen and former editor of Model Airplane News Walt Schroder pose for the camera.

By the time we could set up a meeting with Cole Palen, winter was fast approaching. Cole not only accepted the idea, but was enthusiastic about it. He offered to help out and to donate some WW I aircraft instruments for trophies. Cole's friend and fellow Aerodrome pilot Dick King (both of them model builders) was equally supportive of the idea.

So we went back to the club with the good news. By this time, the club's enthusiasm was starting to build, and they agreed to take on the project. We formed a rules committee consisting of Jim Taylor, Bruce Blake, Ed Lorenz, Bud Standley and me as chairman. I told my AGS friends that the meet was a "go," and asked them to send us their thoughts on rules. In response, I received a letter from Bill Underkofler summarizing the AGS thoughts. They proposed in some detail an aerobatic event with a small bonus for scale appearance. I discussed this with Cole Palen, who showed me a book with many authentic WW I maneuvers described and drawn. Some of these maneuvers were added, the scale bonus was defined, and this became the Rhinebeck "WW I Maneuvers" event.

The Rules Committee decided that we wanted more than just one event. To be successful, we felt we had to appeal to anyone who liked to fly WW I airplanes—from museum scale to just recognizable scale. We also decided that non-scale airplanes such as "Das Ugly Stiks" would not be allowed. To that end, we established three more events:

- **AMA Scale.** Using AMA rules, but limited to pre-1919 aircraft and using any five maneuvers from the "WW I Maneuvers" event. Some in the club wanted this to be the only event, but I believe, had we done so, the Rhinebeck R/C Jamboree would have long since disappeared.

- **Team Combat.** Simulated combat between two military aircraft. This event was later replaced with a "Free Style" event.

- **Balloon Burst, Bomb Drop, and Spot Landing.** Later renamed the "Mission" event.

All planes entered were required to have proof of scale, but only "AMA Scale" and "WW I Maneuvers" planes were judged for scale appearance.

We knew we would have strong support from the AGS, but realized that to be successful, we would also have to draw in participants from other clubs. To encourage that, I wrote an information sheet describing the philosophy, the events and the Aerodrome. This was sent to magazines, clubs and individuals in February, 1967. The rules were finalized and distributed in March of '67.

The day of that first meet dawned bright and sunny. George Buso had initiated his now-famous "anti-rain dance," which has, for 30 years, kept the Jamboree from being rained out. We were gratified by a total of 17 entrants, five of whom were from my old club.

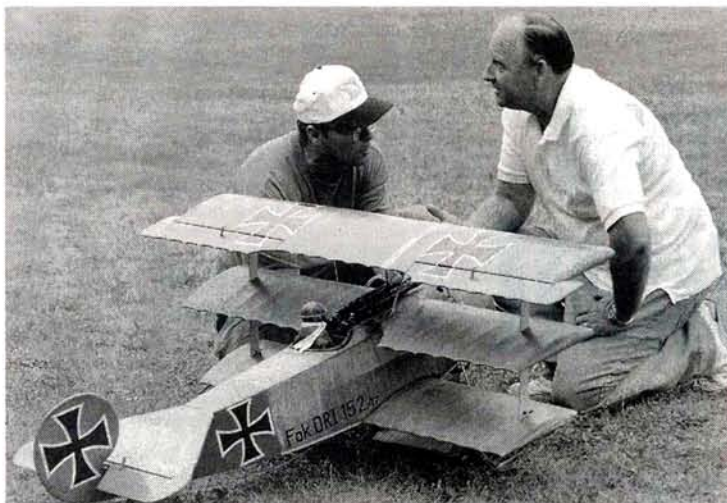
I had been told that we would only need one balloon for "Balloon Burst." Imagine everyone's surprise when Jim Hoover nailed the balloon on the first pass of his first flight! He was flying a Halberstadt, which some "experts" had predicted would not fly because the horizontal tail's area was only 10 percent of the wing's area. Dire predictions of carnage inflicted by



At the first Jamboree, Ed Lorenz and Ken Powell scale-judge Nick Zirolli Sr.'s new S.E.5a (Photo by Bernie Murphy.)

the Aerodrome's plane-eating trees also turned out to be unfounded; only one of the 17 planes crashed.

As I look back upon the 30-year history of the Rhinebeck Jamboree, I can not help but reflect upon why this scale contest has been so successful while the ordinary club-sponsored weekend scale contests—once so common—have all but died out. I have to conclude that it's because all of today's AMA scale events (except Fun Scale) require a real museum-piece replica of a specific full-scale aircraft to be competitive. The Rhinebeck R/C Jamboree has, on the other hand, provided a "Big Tent" with something for every scale flyer interested in early "aeroplanes."—Dick Allen



Bob Curry (left) and Lee Henderson prepare Bob's scratch-built Fokker Dr.1 triplane for another round. The 19-pound model has a 63-inch span and is powered by a Zenoah G-38 turning a 20x6 prop. The Zirolli designed model is painted with Rustoleum paint. Bob finished third in Maneuvers.

SATURDAY NIGHT LIVE

Another great moment for those at this year's Jamboree was the Saturday night dinner held at the Red Hook firehouse. Many of the contestants and the hard-working members of the MHRCS sat down to some good home cooking and listened to an evening of aviation talk hosted by George Buso.

very close friend of Cole Palen's going back to the late 1950s, and he gave a talk on the history of the Rhinebeck Aerodrome. He delighted everyone with some of his personal experiences with Cole and the airplanes they flew together.

Truly, Rhinebeck is much more than just an R/C event; it is an experience full of fun and emotion. If you've ever fancied



Mike Loebbaka of Saugerties, NY, brings his 1/3-scale Sopwith Pup in after another sortie. Mike powered his Pup with a Zenoah G-62 and equipped his model with a smoke system and a bomb/parachute drop. Mike placed second in Free Style.

Dick Allen—the CD for the first Rhinebeck event on September 23, 1967—was in attendance, and he spoke of how the Jamboree got started. Bob Noll also spoke of the early days, displaying the same Nieuport 27 model he flew and won with in the first Jamboree. Bob also flew this 30-year-old model on Saturday. Bob Walker of Robart Mfg. was also acknowledged at the dinner for having the distinction of beating Frank Tiano 25 years ago at Rhinebeck in the Mission event.

The highlight for the evening, however, was guest speaker Dick King. Dick was a

yourself as a Great Waldo Pepper type, or have always had a soft spot in your heart for movies such as "The Dawn Patrol" and "The Blue Max," then you simply must make the trip to Rhinebeck. The magic is real, the aircraft intriguing and the competition fun. White scarf optional! For more information on the Rhinebeck WW I Jamboree, contact CD Gene Terminello, 64 Old Sylvan Lake Rd., Hopewell Junction, NY 10253; (914) 223-7187.

If you're on the Internet, check out the Old Rhinebeck Aerodrome website at <http://www.mainstream.com/rhinebeck.html>. ✈

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PRODUCT
REVIEWAirtronics
Radiant

by LARRY MARSHALL

*Inexpensive and
simple to use*

In recent years, there has been considerable excitement over the introduction of very sophisticated, programmable radios (e.g., Airtronics* Stylus, Futaba* ZAPS, JR* 10SX). This has been with good reason, as these remarkable products permit the diehard flier to do remarkable things when setting up and trimming his aircraft.

But in my view, the really good news is at another "level" in the radio manufacturers' product lines. They are the new programmable radios directed at the sport flier—the guy who wants to fly two or three planes with one transmitter and wants some of the flexibility and power that programmable radio systems can provide, but who doesn't want to spend a lot of money on his radio gear.

To that end, Airtronics has just released the Radiant. Actually, they've

released two Radiants, a 6P for flying airplanes and a 6H for helicopters.

TRANSMITTER

The transmitter for the Radiant is a 6-channel system with typical high-quality Airtronics gimbals controlling the first four channels. Channels 5 and 6 are controlled by a knob control (for flaps) and a switch (for retracts). Case design and feel are personal things, but I have to applaud Airtronics for minimizing the number of dust/dirt-catching grooves on this unit.

It's powered by a

Sanyo 9.6V, 600mAh battery pack.

Those of you who use battery cyclers will be happy to know that the battery plugs into the radio using a standard Airtronics plug, so it's easy to pull the pack for cycling.

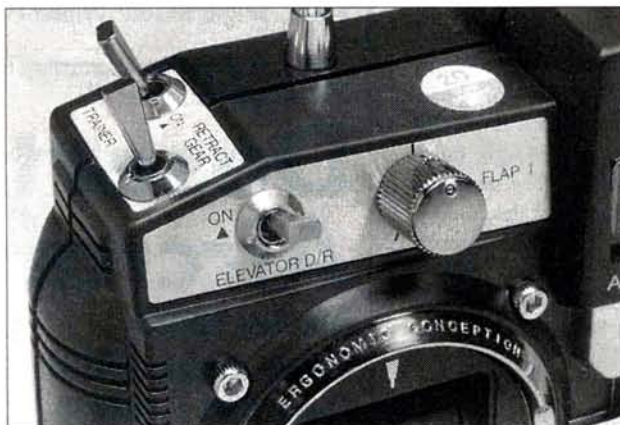
It is the programming method that is the most impressive feature of this radio to me. Instead of traditional menus, where people tend to get lost searching for functions (and that result in 100-page user manuals), the Radiant sticks all the options right on the screen, along the periphery of the display. When you want to change a particular option, you simply use one of the "function select" buttons to cursor to the option you want to change. No memorization is required, no long searches through menu loops.

It's great!

While there are no completely configurable mix options, there is a wide array of mix options available to serve most of the basic control function mixes that are popular today. For instance, the Radiant supports elevons, V-tail, flaperons, spoilerons and differential as well as aileron/rudder, elevator/flap, throttle/elevator and throttle/rudder coupling. Servo reversing, subtrim and end-point adjustments are also available. Aileron/rudder coupling is also controllable (on/off) via a switch.

While there is a dual-rate option, one disappointment is that there is no facility for exponential control of flying surfaces.

It's possible to store setups for three different models in the Radiant. For those who feel a bit uneasy about handing transmitters to impound



The transmitter's upper left-hand quadrant. The retract switch controls channel 5 while the flap knob controls channel 6.

SPECIFICATIONS

Model: Radiant 6P

Type: 6-channel radio system; available on 50, 72MHz

Manufacturer: Airtronics

Transmitter: 6 channels; 3-model memory; with trainer system

Receiver: 92765 (FM)

Servos: four 94102 servos

Accessories: switch harness; Sanyo 600mAh battery pack; accessory pack; channel numbers; aileron extension; 110V AC wall charger; manual; neck strap

Weight of airborne system: 11.0 oz.

Street price: \$210

Features: a microcomputer system; clean case design; adjustable control stick length; 3-model memory; trainer function.

Comments: the Radiant 6P is extremely easy to program, eliminating most of the need for the learning curves that have caused many people to avoid programmable radios. It provides considerable functionality at a low price.

Hits

- Sets a new standard for ease of use.
- Transmitter battery has a plug for use with cyclers.
- Very reasonable price.

Misses

- No exponential option.

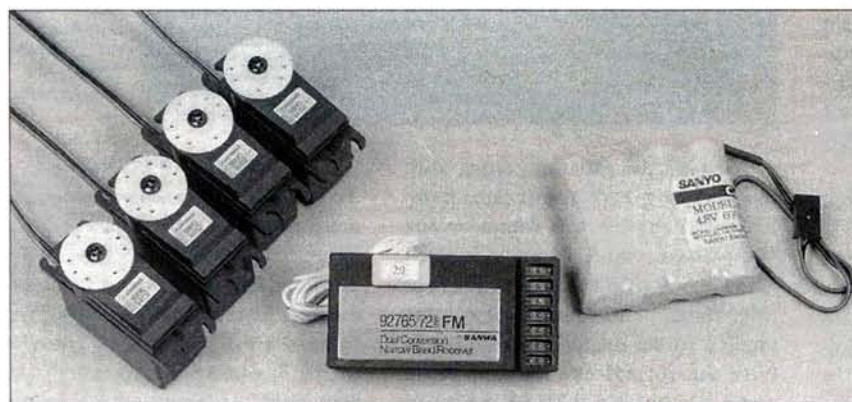
areas, the Radiant provides a feature allowing you to "lock" the memory of the transmitter so that inadvertent button pushing will not affect what is stored in memory. With the Radiant, you must rely upon the mechanical trim controls for aircraft trim, as trim positions are not stored in the aircraft memory.

Also, unlike its predecessor, the Quasar, the Radiant has the ability to be used with a buddy box connected to the Vanguard series as well as other Airtronics programmable radios such as the Infinity 660.



The transmitter's upper right-hand quadrant features a three-position switch that provides considerable flexibility for flap/elevator mixing.

6-channel, 92765 FM/PPM dual conversion narrow band receiver, four 94102



The airborne system consists of a 6-channel RX, four standard-size servos and a 600mAh battery pack.



Here's a close-up of the display. The radio is actually turned off in this photo, but note that all function options are visible. As you cursor through the options, pertinent displays occur in the middle portion of the display.

AIRBORNE SYSTEM

The Radiant airborne system consists of a

servos, a 4-cell, 4.8V, 600mAh battery pack, a switch harness and an aileron extension. The servos are standard size, and the total airborne weight is 11.0 ounces.

MANUAL

Because of the straightforward manner in which you program the Radiant, the manual is far less formidable than those of many other programmable radio systems. Each function is described graphically as well as in text. I found it quite complete. Airtronics even provides a detailed description of the antenna replacement procedure for people like me who seem to have an

affinity for bending them on occasion.

CONCLUSION

I'm impressed with the Radiant. It's especially suited to those who have avoided programmable radios because they are "complicated." It's the first programmable radio I've seen that can be programmed without needing the manual. I'd feel very confident in recommending this radio to folks wanting a first-class programmable radio at a reasonable price.

*Addresses are listed alphabetically in the Index of Manufacturers on page 123.



Golden **AGE** OF R/C

by HAL deBOLT

MULTI-PLANE RACING EVOLUTION

BACK TO pylon-racing history. This has proved to be lengthy! A great many OT'ers have raced in one form or another. We discussed this subject previously in the January and February '97 issues.

When Formula I was in its heyday, some enterprising modelers dreamed

smaller model size, 1/4 Midget was flown on a shorter, 375-foot course, resulting in heat times close to those seen in Form I.

Let's retreat back to the beginning and AMA Pylon, where one plane at a time sped around two pylons. Recall that many pilots used their "everyday" models for this event. When the FCC finally allotted us five spots on the 27MHz band, multi-plane racing became possible.

Although AMA Pylon was never open to multi-plane racing, the idea gained acceptance, and thus an unofficial sport racing event came into being and quickly gained popularity. When clubs and major competitions scheduled Goodyear races, a sport race would often be included to satisfy the grassroots movement. Then, too, many major pattern events saw sport racing as an attraction that would break up the aerobatic routine. The bottom line is that sport racing flourished. R/C'ers enjoyed the racing adrenaline with their sport models, and many progressed to the formal events.

up another event that could be added to the schedule. (I wish I could recall the instigators. Maybe you can help?) The event was called "1/4 Midget"—don't ask why; we never did know. If you recall, Formula II was created as a more attractive event for average modelers, but it never progressed as anticipated. It was thought that 1/4 Midget with its much lower cost might be the key. Actually, more than anything, it provided another place for the Form I people to duke it out! Don't misunderstand; newcomers were evident, but far fewer than hoped for.

Basically, 1/4 Midget was tailored after Form I except the required .15-size engine demanded smaller aircraft specs. Pilots could pattern their models after any full-size racers; this often led to an attractive variety at the starting line. You might see a P-39, a P-51, a Firecracker and a Caudron dueling for the lead in one heat! Because of the



Note the clean lines of Cliff Weirick's early winning Midget Mustang Goodyear racer.

The fuselage had to be a "box" and couldn't even have rounded corners! A "sport stock" front rotor .40 engine was required. Other details escape my recollection, but such rules did level the playing field!

When an inexpensive kit was offered for the event, Q500 really took off across the country. Many, many clubs offered Q500 races, and more and more R/C'ers became intrigued by pylon racing.

As a side note: England latched onto the idea and established its own version, calling it Q300 (if my memory is correct) and restricting the engine size to .20. As in the U.S., their event also blossomed handsomely!

It was hoped that Q500 and/or the sport races would be training grounds for potential Formula pilots; however, the idea was tarnished a bit when the veteran racers saw Q500 as an attractive diversion and much fun!

Bob Violett displays the Sopwith Cup while Cliff Telford holds their FAI Special, which was powered by a reworked SuperTigre.



Hal deBolt's combo Form II and FAI Caudron HP .40 on alcohol and Rhom Air retracts placed fifth at the Aerolympics.

As might be expected, along with this popularity and growth came problems. An answer was found on the West Coast, where an event labeled Quickie 500 (Q500) came to life. For this, fundamental restrictions were applied to the model and engines as with the formal events. The wing could not be less than 50 inches in span and 500 square inches in area.

SPORT RACING

Today, the AMA recognizes four separate classes of what could be labeled sport racing. Offhand, this suggests considerable interest in this style of racing. There's even a 1/2A event! Others are variations of the Q500 theme. It's interesting to note that current Nats see heavy entries in these events, far in excess of Form I.

With the elimination of Form II and the 1/4 Midget events, the NMPRA saw fit to introduce a new event, again tailored to attract newcomers, called Q40.

To keep the cost down, the engine was restricted to a stock, muffler-equipped front-rotor .40. Strangely, the model size is a bit smaller than that of Form I, but the model can be tailored after any full-scale racer. The availability of Form I

model kits (although they're a bit over-size) offers a simple way to enter Q40. I would think that anyone shying away from Form I because of exotic complexity, great expense and lack of experience might find Q40 of interest.

The Federation Aeronautique Internationale (FAI) has recognized model aviation from early on and along the way has shown progressiveness.

Free-flight and control-line had long been on its agenda, so when R/C came of age they adapted an aerobatic event leading to a World Championship, first in 1960. Soon after, the FAI's extensive adaptation process began for R/C racing. While our Goodyear event and others had flourished, pylon racing had not taken hold internationally. Worldwide thinking was diverse and, in general, frowned on what we had as "hot rods" with little practical use. Eventually an event similar to our Form II was adapted, the differences being racing plane styling and fuel restrictions.

For an FAI event to reach world championship status several international events must be held to indicate desirability. In 1971, the AMA conducted an FAI World Aerobatic Championship at Doylestown, PA, and added an international pylon event to the schedule. I was pleased to CD the event with the help of Karlton Randell (sad that "Red" is long gone). Although the event drew some foreign entries, the attendance was lower than hoped for. The American combo of Telford and Violet won rather easily.

The English were sponsoring yearly FAI races with the Sopwith trophy at stake. In 1972, the Telford/Violet team ventured there and brought the Sopwith Cup to the USA.

In 1974, the AMA sponsored an extravagant Aerolympics at Lakehurst, NJ, that included an FAI pylon race. This show was well-attended by R/C, aerobatic and CL people from throughout the world. Although the pylon event was successful, it did not show world champ potential. Who won? Telford and Violet, of course!

After this, the FAI had serious thoughts about the viability of pylon racing as a world-class event. As a result, they went to AMA's John Worth for suggestions. In turn, John came to me and asked if I would chair the FAI pylon committee and find an answer? Trying to get so many countries to agree on what obviously needed a major change seemed rather difficult, but I never dreamed what a long, drawn-out process it would prove to be.

This edition's space has gone, so the remainder of the FAI pylon racing history will have to wait for next time.

And so our heritage was. Do remember this is your OT R/C place! ✈

PYLON RACING CIRCUITS

With any sport, ongoing success requires organization and activity. Early R/C pylon racing saw the worth of this and organized racing "circuits." Those that come to mind are a couple that existed in Florida and California. More prominent were the New England and Michigan circuits and the United Pylon Racing Circuit (UPRC) of western New York and Canada. It's apparent that where



Canada's Dave Kelly with his 1977 Form I champ, the Stinger.



Prominent in the UPRC, Ernie Nikodem of Lockport, NY, is shown here with his 1/4 Midget P-51.

circuits existed, racing interest flourished. As an example, the UPRC is still alive and well.

In the early '70s, pylon racing was popular in western New York, but everyone always asked, "Where will the next race be and how will it be run?" Howard Dart of Jamestown, NY—an avid R/C'er—came to me with the first thought of organizing a racing circuit. After much thought, we decided that we'd need several scheduled races, experienced workers and sophisticated Form I and Form II events. It was also realized that for continued success, something was needed to attract newcomers. The answer to that was a sport racing category, which encouraged racing any sort of .40-powered sport plane. It was a "Race what you got" event, with no racing engines or props allowed.

The circuit idea was presented to three western New York and two Canadian clubs. The criterion was that no race should be more than a two-hour drive away for any of the club members. The idea was accepted with relish, and the UPRC was off and racing. Other factors that contributed to the success of the circuit included the newsletter published after each race that provided the final standings and details of the next race, and an UPRC annual championship for each category and a grand champion perpetual trophy. Champs received an appropriate jacket, and the season ended with a championship race followed by an awards banquet. Each club conducted one race per season, and points earned at each race were accumulated toward the championships.

What made the UPRC so successful? The first reason might be the organized and hard-fought competition. Would you believe it took me 10 years



The UPRC perpetual trophy and typical race award and Hal deBolt's championship racers.

to earn the championship? Second would be the niceties, plus exclusive awards. All of this made the UPRC beyond most model competitions.

HOLLYWOOD ZERO

*In flight, the plane looks great!
Unlike the real Zeros, this
plane will not be used for any
kamikaze missions!*



.60-size pseudo samurai

by
JIM SANDQUIST

EARLY ON IN MY involvement in the hobby, I wondered why there was not a good line of .60- to .90 size warbirds available to the average modeler. Recently, that void has been filled with the newly re-engineered kits from Top Flite*, the newest being the Hollywood Zero!

HOORAY FOR HOLLYWOOD

When Japan agreed to destroy all Zero fighters after WW II, they unfortunately eliminated the Zeros available for airshows, museums and films. Hollywood's

answer was to convert the plentiful AT-6 Texans into Zero replicas, hence the name "Hollywood" Zero. Top Flite has done the same thing at the R/C level by making the needed changes to its Gold Edition AT-6 Texan. Though this kit is a "Zero Replica," it is still a legitimate contest model, and scale documentation is available. Depending on the way you want to build the Zero, it can be a basic 4-channel sport model or it can have the full complement of flaps, retracts and drop tank. For my purposes, I built the model with all the scale functions.



PHOTOS BY JIM SANDQUIST

SPECIFICATIONS

Manufacturer: Top Flite

Type: sport scale

Name: Hollywood Zero

Wingspan: 72 in.

Wing area: 713 sq. in.

Weight as tested: 10 lb.

Wing loading: 32 oz./sq. ft.

Length: 49.5 in.

Engine req'd: .61 to .91 2-stroke or .91 to 1.20 4-stroke

Engine used: O.S. .61FP

Radio req'd: 4- to 7-channel with 4 to 8 servos (rudder, elevator, ailerons, throttle, retracts, flaps and drop tank)

List price: \$259.99

Features: the Hollywood Zero is a modified AT-6 Texan kit and includes all the parts to make the scale Zero. The kit is typical of Top Flite's Gold Edition series

of scale warbirds and includes formed and cut balsa and ply parts, illustrated instructions, formed plastic cowl and canopy, hardware, engine mount, decals and full-size plans.

Comments: the Hollywood Zero is a great flying scale model and would be a good choice for a modeler's first scale project. There are optional accessories available, including: a drop tank (\$14.99), a scale radial dummy engine (\$12.99), an in-cowl muf-

fler (\$24.99), a header pipe for muffler (\$16.99), a 3-blade static prop (\$24.99) and Robart retractable landing gear (\$126).

Hits

- High quality.
- Very complete instructions.
- Well drawn plans.
- Fabulous flyer!

Misses

- It's tough to find a scale Japanese pilot!



Dummy engine, drop tank, machine guns on the top of the fuselage, retractable gear and the 3-bladed static prop are all nice touches not usually found on the average sport model.

THE KIT

One of the high points of building this kit is the instruction manual. It has been meticulously written and is a step-by-step guide for the modeler. The manual is also well illustrated with black and white photos for each step of the way. The instructions are actually for the AT-6 and have an addendum for the needed conversions for the Zero.

• **Fuselage.** A round fuselage can some-

times be tricky, but not here. The fuselage formers are interlocking lite ply with balsa longerons. Once constructed, balsa sheeting is glued to the fuselage structure. The initial fuselage frame-up took only a couple of hours. It is worth noting that all of the plywood die-cut parts were some of the best die-cutting I have ever seen.

The engineering of this fuselage was obviously well thought out. By following the instructions you will find that the correct amount of right thrust for the engine is already built in. The wing saddle allows the wing to sit in perfect alignment with the horizontal stabilizer without any shimming of either the wing or the stabilizer.

• **Tail surfaces.** The tail surfaces are conventional and straightforward. The horizon-

tal stabilizer is balsa-sheeted while the rudder is an open-bay structure to give the look of the full-size counterpart. The rudder is also the first major change from the AT-6 to the Zero. Once again, the die-cutting was very good, and the ribs fit the spars very well without any shimming.

• **Wing.** When you get started on the wing you are going to have to make a few choices. Do you want flaps, retracts, and/or the drop tank? I would encourage you to at least consider the flaps and the retracts. Let's face it, warbirds just don't look right flying by with the gear hanging down! There are tabs on the edges of the ribs that act as a jig while you're building the wing. These tabs assure you of building the wing straight with minimal effort. The ribs are all die cut requiring a minimum of sanding. The notches in the ribs for the spar are cut so well that the wing can practically be pre-assembled on the bench before gluing.

Complete instructions for installing the Robart* retractable gear are included. If you have never had any experience with retracts, don't let this stop you. Top Flite and Robart have taken the mystery out of retracts for this kit. You will not have any problem with installation.

The flap construction was the only part of the kit that I found somewhat tedious. Though not difficult, it is worth taking your time to build these per the instructions. Rushing through and not following the instructions exactly could yield a twisted set of flaps. I felt that the time had been well-spent once the plane was airborne. Flaps allow this plane to come in at walking speed.

• **Powerplant.** I will admit up front that I was a skeptic. The advertised weight of 7 1/2 to 10 pounds seemed too much to allow an O.S.* .61 2-stroke engine to bring this plane to life in the air. A quick call to the folks at Top Flite and they assured me that the .61 would be plenty of power. They were right! My plane came in at a shade over 10 pounds, but flies with authority, even vertical! The other major benefit of using the .61-size engine is that it completely fits in the cowl and is well hidden by the optional dummy engine. Top Flite also has an

ROBART RETRACTABLE GEAR

If you are like I used to be, retracts may be a bit of a mystery to you. There really is no reason to shy away from them. Robart and Top Flight have put together installation instructions that allow the gear to be installed quickly and operate well.

The retract system consists of four basic components: the air tank, the fill valve, the control valve and the landing gear, which are each operated by internal air cylinders. A servo activates the gear.

Installing the landing gear is as simple as screwing the landing gear plate to the hardwood rails, routing the air line and mounting the fill valve and the control valve. That's it. Easy!

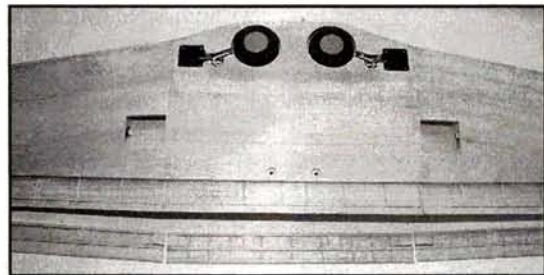
An airplane with retractable gear has a couple of advantages over standard fixed gear.

1. There is less drag so the plane performs better.
2. They add to the realism of the plane.
3. Most planes don't have retracts, so your plane stands out from the rest!

If you have ever wanted to experiment with retracts I can think of no better project than the Hollywood Zero to give them a try!

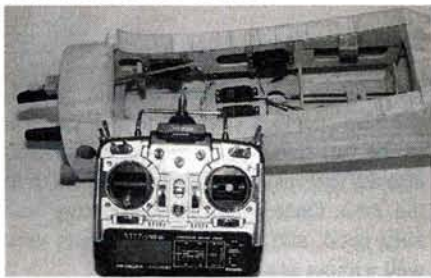


Here are the basic components of the retract system: air tank, landing gear, control and fill valve and air line.



Installation in the wing is simple and neat. Four screws hold the gear to the plywood mounting rails.

HOLLYWOOD ZERO



The 8-channel Futaba is the heart of the system and is more than adequate to handle all of the plane's mechanical options.

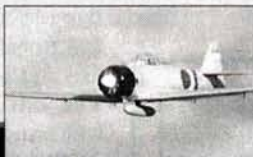
available scale muffler that completely fits within the cowl and allows the exhaust to exit at a scale location. Flying with an 11x7 propeller the sound output measured an acceptable 96dB at 9 feet.

• **Radio** I used the new Futaba* FP-8UAP. This gave me all the capability I needed to handle the flaps, retracts and ordnance and

• Takeoff and landing

The O.S. 61 is more than adequate to get the Hollywood Zero airborne. The plane tracks very straight, needing very little rudder correction. Takeoffs from asphalt had the plane airborne in approximately 75 feet without using flaps.

The landings are fun! Drop the



FLIGHT PERFORMANCE

gear and turn onto final, deploy the flaps and have the engine at about 1/3 throttle. The plane slows nicely with no noticeable ballooning. The plane will literally walk into final touchdown with a minimal roll-out.

• Low-speed performance

Even without the use of flaps, this plane slows quite nicely. With flaps, the plane will slow considerably more. In either case, the plane stalls very predictably. Stalls are gentle and straight forward with no tip-stalling.

• High-speed performance

This plane flies very well on the O.S. 61. I can't imagine anyone wanting or needing more power. The plane goes exactly where it is pointed, it responds smoothly, and it has very good vertical performance. I found myself generally flying at 1/2 throttle.

• Aerobatics

I found the plane does very nice warbird aerobatics—victory rolls, 2- and 4-point rolls, nice big loops, split-S's and Cuban-8s. Spins were very predictable, and the plane stops spinning as soon as the controls are neutralized. Knife-edge flight was difficult to hold, but otherwise, the plane did everything that I asked of it. Overall, I find the plane is a joy to fly!



My Daddy was a Texan!

Movies like "Tora, Tora, Tora" and "Midway" would have been impossible to film had it not been for the conversion of AT-6 Texans into the Hollywood Zeros that were used in abundance in those films. The Top Flite Hollywood Zero has the same type of lineage and can trace its roots to the Top Flite AT-6 Texan Gold Edition kit.

Here are the Texan's specs.

Wingspan: 69.4 in.

Wing area: 713 sq. in.

Weight: 7.5 to 10 lb.

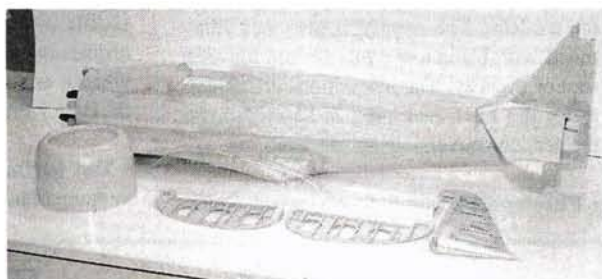
Length: 49.25 in.

Engine req'd: .61 to .90 2-stroke, .91 to .120 4-stroke

Radio req'd: 4- to 6-channel w/4 to 7 servos (ailerons, rudder, throttle, elevator; flaps and retracts optional)

Price: \$249.99

the additional reliability of PCM modulation. Standard servos were used throughout. One servo each is required for the throttle, elevator, rudder, retractable landing gear and ailerons. Two servos are required for the flaps.



Here are the fuselage components ready for final assembly and covering.

FINISHING

Once completed, all that remains is to final-sand and cover the plane. A 12-inch-long sanding bar really helps to sand the seams on the fuselage and wings. You want the surfaces smooth and even, so

that when your plane is covered, you'll get that painted-metal look. To keep the weight down and allow quick finishing, I chose Top Flite MonoKote. Once covered, all decals were applied and panel lines were then put on using the new Top Flite MonoKote Pen. Plastic components were painted with the new Top Flite Lustre Kote paints. The color matches the MonoKote

perfectly and flows on with no orange peel effect.

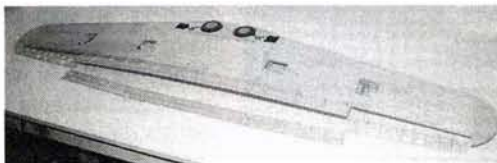
CONCLUSION

My personal interest in R/C is scale. It is nice to see a kit that can allow an average modeler to get his feet wet without spending a lot of time and money. With this kit you will have a great-looking plane that club members will take notice of—a plane to get yourself started in competition and a great flyer, too!

*Addresses are listed alphabetically in the Index of Manufacturers on page 123.



Here's a close-up look at the flap construction. The flaps are very effective on this plane and are worth the effort to put them in.



The wing completed and ready for covering. Retracts have already been installed.

by JIM ONORATO

Carl
Goldberg
Models

Bücker Jungmann



The Carl Goldberg Models (CGM*) Bücker Jungmann kit features conventional built-up construction using lite-ply, balsa, basswood and plastic and contains a complete hardware package and a 56-page detailed construction manual, which includes numerous photos and illustrations to guide you through the building process. It also contains setup and flying hints by designer Dave Patrick. Like other Goldberg kits, this one includes materials and instructions for building those neat little sanding tools for rounding and beveling the tail feathers and control surfaces. A separate booklet of general information on building and flying R/C aircraft, two sheets of plans, pre-formed aluminum landing gear and cabane struts, ABS cowl and wheel pants and a vacuum-formed, clear plastic canopy/fuse front piece are also included.

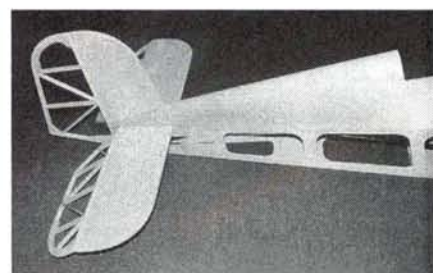
TAIL FEATHERS

I used Balsa USA* thin and gap-filling CAs for most of the balsa construction and Great Planes* epoxy on the plywood.

Construction began with the tail feathers, which, although straightforward in construction, required a lot of sanding that I think could have been avoided.

The curved sections of the elevators and rudder are made up of one $\frac{3}{16}$ -inch die-cut piece and two $\frac{5}{64}$ -inch die-cut pieces, which, when laminated, end up $\frac{1}{32}$ inch thicker than the $\frac{5}{16}$ -inch stripwood used for the rest of the structures. Consequently, all of the laminated die-cut parts had to be sanded down $\frac{1}{32}$ inch to match the thickness of the stripwood. The stab and fin are built up with $\frac{3}{16}$ -inch stripwood and die-cut parts and are then sheeted with $\frac{5}{64}$ -inch balsa, which makes them $\frac{1}{32}$ inch thicker than the elevators and rudder. As a result, they also had to be sanded down $\frac{1}{32}$ inch. The use of $\frac{1}{16}$ -inch instead of $\frac{5}{64}$ -inch sheets for the die-cut parts and sheeting would have eliminated a lot of unnecessary sanding.

If you're going to use an engine in the upper range, you might want to add wire braces to the tail feathers. If so, you should



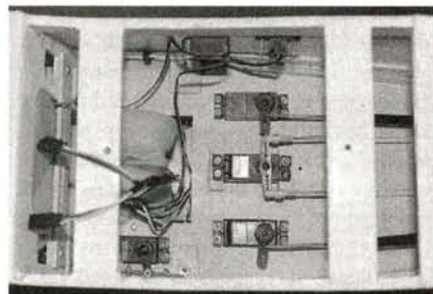
The tail feathers of the Bücker are lightweight and strong. The sizes of the balsa material, however, required a lot of sanding to make everything match in thickness.

build dowel hard points into the fin and stab where the braces will be attached. (I decided to add .055-inch-diameter wire braces to the Bücker's tail feathers after test-running the Saito* FA-150 and seeing how powerful it was.)

WINGS

The Bücker's top and bottom wings are basically the same and are built directly over the plans. They have symmetrical airfoils, are swept back, and neither has any dihedral. Eight of the ribs have tabs that keep things aligned as the wing is built. When the wing is removed from the building board so the sheeting can be applied to

the bottom side, the wing is set on four "cradles," which keep things straight. The main differences in the two wings are in the center sections and the bays where the interplane struts are attached. The center section of the bottom wing includes mounting plates for the landing gear and parts related to attaching the wing to the fuselage. The bottom wing also contains two aileron servos that control the Bucker's four ailerons. The center section of the top wing contains the four mounting plate assemblies for attaching the wing to the cabane struts. Extra care must be taken



There's plenty of room for any radio system you care to install.

when installing these assemblies, as the final seating of the mounting plates affects the alignment of the top wing. (Incidentally, in step no. 27 of the instructions, the reference to rib doubler "B" should be "C" and vice versa.)

The use of 5/64-inch sheeting also required extra sanding when building the

SPECIFICATIONS



The author (right) makes a few last-minute adjustments.

Model: Bucker Jungmann (kit no. K-51)

Type: scale aerobatic biplane

Manufacturer: Carl Goldberg Models

Wingspan: 64.75 in.

Wing area: 1,152 sq. in.

Weight: 10 lb., 12 oz

Wing loading: 21.5 oz. per sq. ft.

Airfoil type: symmetrical

Length: 54 in.

Engine req'd: .61 to 1.20 2-stroke or .91 to 1.50 4-stroke

Engine used: Saito FA-150 4-stroke

Radio: 7-channel w/6 servos

Muffler: Saito

List price: \$299.99.

Features: conventional, built-up balsa and lite-ply construction, sweptback wings with symmetrical airfoil and four "barn door" ailerons, bent aluminum cabane struts and landing gear. Additional items include a complete hardware package, vacuum-formed canopy/fuse front, ABS cowl and wheel pants, self-stick decals, 56-page instruction manual and two sheets of full-size, folded plans.

Comments: the Bucker is engineered to build quick and true and makes a great Sunday flyer. Its overall appearance and outstanding flight performance more than make up for the few things I considered "misses" in this review.

Hits

- High-quality materials and complete hardware package.
- Fully illustrated, step-by-step instruction manual.
- Flying and setup hints by designer Dave Patrick.
- Excellent flight performance.

Misses

- Use of 5/64-inch instead of 1/16-inch sheeting.
- Hard-to-reach interplane strut attachment.
- Rather flimsy ABS cowl.

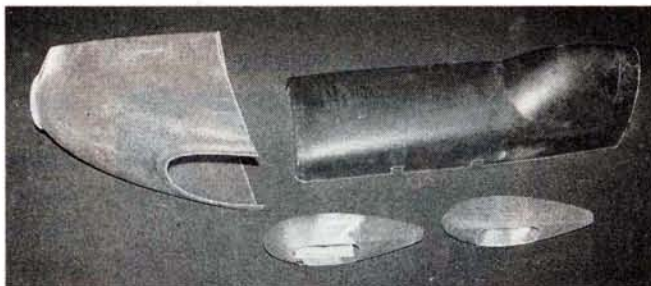
IMAA-legal aerobatic fun



CARL GOLDBERG MODELS BÜCKER JUNGSMANN

wings because the rear edge of the wing ended up thicker than the trailing edge stock used for the trailing edge and the ailerons. I ended up using a lot of Model Magic* filler to get things smooth and level. (It might have been easier to laminate 1/32-inch sheeting to the trailing-edge stock.)

The instructions call for the aileron servos to be installed before covering the wings; this would make them inaccessible. Because I don't like to bury any radio components, I made removable hatch covers out of 1/16-inch plywood and mounted the servos directly to them so that the servos could be removed easily.



I replaced the plastic parts in the kit with these lightweight fiberglass moldings from Aeroglass.

I also modified the way the interplane struts are attached to the wings. The interplane struts are 1/16-inch wire with nylon clevises at each end that are supposed to attach to birch plywood wing ribs through holes below the sheeting on the wings. I found that it was difficult to make this

attachment, even before the wings were covered, so I decided to add external tabs to the ribs so that the attachment could be made on the outside.

FUSELAGE

The fuselage is built of interlocking die-cut parts (mostly lite-ply) that self-align during construction. Most of the fuse was assembled and held together

with tape and rubber bands, then glued after it was properly aligned. I tack-glued it with CA+, then went over all the joints with thick CA.

The fuse assembly instructions call for drilling four holes for the cabane struts in step no. 6 and attaching the cabane to the fuse in step no. 14. I recommend that these steps not be done until the top wing is aligned in step no. 22. Because the blind nuts for attaching the cabane struts to the top wing are already installed when the top wing is built, the only place to make adjustments to compensate for small variations in building is where the cabane struts are attached to the fuse. If these four bolt locations are fixed ahead of time, the top wing may not be aligned correctly.

The turtle deck is constructed of 1/32-inch plywood formed over two lite-ply formers. I sprayed the ply with ammonia and water to get it to bend easily. The final step in the fuselage construction is the attachment of the vacuum-formed, clear plastic canopy/front, which extends from the turtle deck to the firewall. I replaced this piece with a fiberglass duplicate available from Aeroglass*.

The cowl and wheel pants are made of ABS plastic. Because of the length of the cowl and the thickness of the ABS plastic, the cowl tends to be a bit flimsy unless reinforced with nylon fabric and CGM

FLIGHT PERFORMANCE

the throws recommended for the sport setup when set at low rate and 70 percent of the throws recommended for the airshow setup when set at high rate. The first flights were made on a cool, clear, calm day from a grass runway. All dual-rate switches were set to "low" with exponential on all controls.



• Takeoff and landing

I held full up-elevator while taxiing to keep the Bucker from nosing over, and it handled very well on the ground. With full up still applied, I began the takeoff roll by slowly adding power while reducing the up-elevator. Tracking was good without any right rudder required to keep it going straight. Flying speed was achieved quickly at half throttle, and with just a little up-elevator still applied, the Bucker lifted off smoothly. It climbed out nicely with the wings perfectly level.

Landings were just as easy. My first was a deadstick, and since I wasn't yet familiar with the stall characteristics of the plane, I made no attempt to slow it down or stretch the

glide. To my amazement, the Bucker just kept on gliding and came in fairly hot for a perfect wheels-on landing. It rolled right up to the very edge of the mowed grass before the tailwheel touched down. Whew! On subsequent landings, I slowed the Bucker way down and flared it just before touchdown for beautiful three-point landings.

• Low-speed performance

The Bucker Jungsmann is smooth and predictable at low speeds. It has a very low stall speed, and its stalls are gentle and straight ahead. I was pleasantly surprised to see how well it flew at low speed.

• High-speed performance

Even with the large engine, the Bucker is not a "rocket" and is not the least bit intimidating to fly. It has a great feel, tracks extremely well and is a smooth and stable flyer. It didn't have any bad tendencies at high speed.

• Aerobatics

The Bucker is highly aerobatic and capable of just about any maneuver in the book. Loops, rolls, spins and knife-edge flight are easily performed with the sport setup. With the increased throws in the airshow setup, the Bucker can perform wild stuff such as flat spins, Lomcevak and all kinds of tumbling maneuvers. Unlike many biplanes, the Bucker has virtually no pitch or roll coupling; this allows for easier slow rolls, point rolls and knife-edge flight.

The completed Bucker ready to cover.



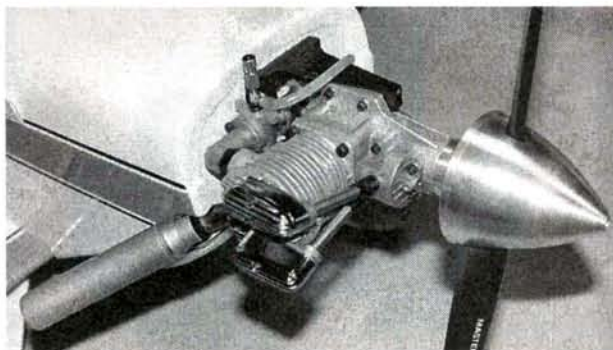
Cowl Bond or fiberglass cloth and resin. I took the easy way out and replaced the cowl and wheel pants with fiberglass parts available from Aeroglass. A fiberglass cowl is also available from CGM.

I made one other modification to my kit: I used screws to attach the fuel tank tray in the fuse rather than gluing it in permanently as shown in the instructions.

RADIO AND ENGINE

I used six servos in the Bucker: two for aileron, two for elevator, one for rudder and one for throttle. Goldberg recommends the use of two elevator servos if an engine in the upper range is used. I located the two elevator servos under the canopy and used heavy-duty pushrods, 4-40 hardware and Robart* control horns. The rudder servo, with a pull/pull setup, was also placed under the canopy. The aileron servos were located in the bottom wing just in front of the ailerons. The ailerons in the top wing were connected to the bottom wing ailerons with 1/16-inch wire connectors.

I powered the Bucker with a Saito FA-150 4-stroke using a stock muffler and a 16x8 Master Airscrew* propeller. The stock muffler is rather large and protrudes



The Saito 150 fits nicely and is a great choice for the Bucker's powerplant.

from the side of the cowl, but it gives the FA-150 a very nice sound, especially at idle. For those who don't like to see a muffler sticking outside the cowl, Slimline* makes a Pitts-style muffler for the 150 that can be totally concealed. A beautiful 3-inch Tru-Turn* aluminum spinner completed the power package.

FINISHING

I covered the Bucker with orange, white and black CGM Ultracote and used 1/8-inch black CGM UltraStripe for the pin-striping. UltraStripe is sticky on one side and can be positioned and repositioned easily, then permanently sealed with a sealing iron. It is polyester and doesn't melt or bubble when heat is applied to the covering. I used Coverite's* 21st Century spray paint on the canopy and wheel pants and HobbyPoxy* paint on the cowl (21st Century orange doesn't match Ultracote orange very well).

CONCLUSION

The Bucker has an attractive appearance and outstanding flight performance, and it's engineered to build quick and true. If you love biplanes, as I do, you'll enjoy building and flying Goldberg's Bucker Jungmann.

*Addresses are listed alphabetically in the Index of Manufacturers on page 123.

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by DAVID M.
SANDERS

IN THE MARCH '97 issue, we took you up to a primed, ready-to-paint aircraft. Now it's time to get some war paint on that beauty.

PRELIMINARY PANEL LINING

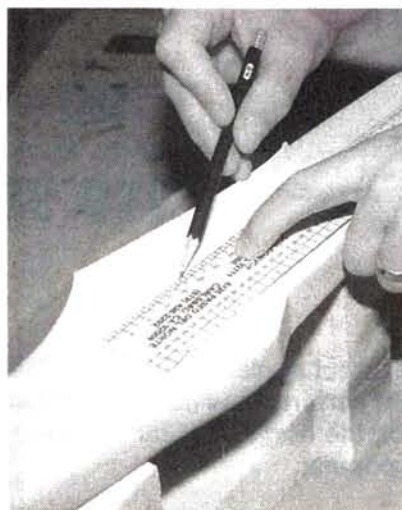
Full-scale aircraft painters often use panel lines for alignment of markings, and the fuselage will usually have at least one panel line that runs nearly from nose to tail. In photo 1, I'm using a sharp pencil and straightedge to lightly mark one on the model. Carefully establish the exact height of its endpoints so it can act as a datum for the others. It's just dark enough so you can faintly see it through the paint when applied. Wings and tail surfaces are done similarly. Only do enough lines

to properly align insignias, stripes, or camouflage boundaries. As you proceed with painting, go over them with the pencil as required to ensure visibility through the entire process.

There's no substitute for
paint. Paint is pride!

Painting and detailing warbirds

Basic finishing techniques



1 Draw a data line that runs from nose to tail to orient markings.

AIRBRUSHES AND PAINT RAP

My techniques work with nearly any paint, but I prefer flat enamels, like Testor's* Model Master enamels. What you're looking for is fast drying, resis-

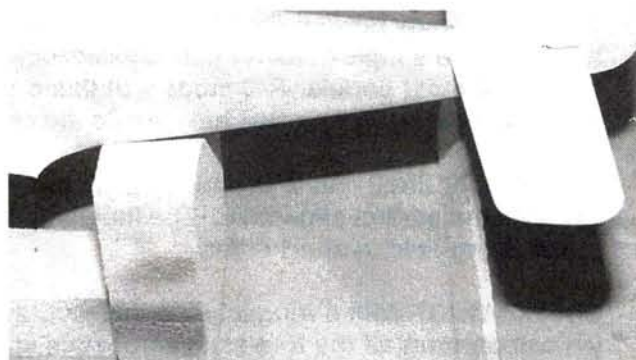
tance to peeling with masking tape and easy clean-up. Also, be sure the paint is compatible with your clear coat, which determines the final finish gloss and protects against fuel, handling, etc.

I've used several airbrushes and, for large models, automotive "touch-up" guns. Touch-up guns can cost a lot, but airbrushes are fairly reasonably priced. I've recently acquired a Badger* 200 that's excellent for camouflaging, and it's used for this project. All my airbrushes are "single-action"; the trigger button controls the air only. A "double-action"

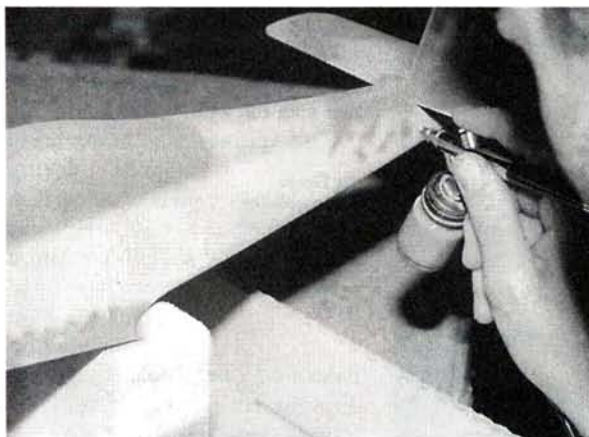
gun's staged trigger button shoots air independently, then with further move-



2 Cut multiple masking tape masks for markings by cutting through several layers of tape.



3 Here, the marking masks are in place, waiting for paint.



4 *Mottled camouflage is easy to do with an airbrush, but practice on card stock to establish proper mottle density and size.*



5 *When painting different camouflage colors, shoot the boundaries between the two colors first, then fill in the rest.*

ment, paint. Single-action guns are easier to use and clean, so I recommend them. I use an air compressor with a pressure valve and water trap. You can buy compressed air in cans for small models, but if you're painting gigantic beasts, you'll want a compressor.

Always have a supply of compatible thinner on hand! I have three airbrush bottles available during a painting project; one of them contains thinner. I use this bottle to "quick-clean" the gun when taking breaks or switching colors. You'll need to thin the paint for the gun; generally, gloss requires more thinning. Most glosses need a 1:1 mix, but flats usually use a 2:1 paint-to-thinner ratio. Test the gun on white card stock to find the best ratio. You want the paint to cover well but not look "cakey" (too thick). Nor should it be thin and runny. As well as the instructions for your gun, there are many books available to help you get the best performance from your gun/paint combination.

Finally, there's clear coat. I like Varathane Polyurethane, which comes in gloss or satin and is packaged in aerosol cans or brush cans. If using the brush type, be sure to get some compatible thinner so you can shoot it through the gun. On military models, I use the satin type in an aerosol can. For a gloss finish, it's best to clear coat with the gun, which gives a more uniform film. For power planes, good ole K&B*, which imparts a thick, chip- and fuel-resistant coating, is still my favorite.

MASKING AND PAINTING

The secret to vibrant color on your models is to shoot light colors first,

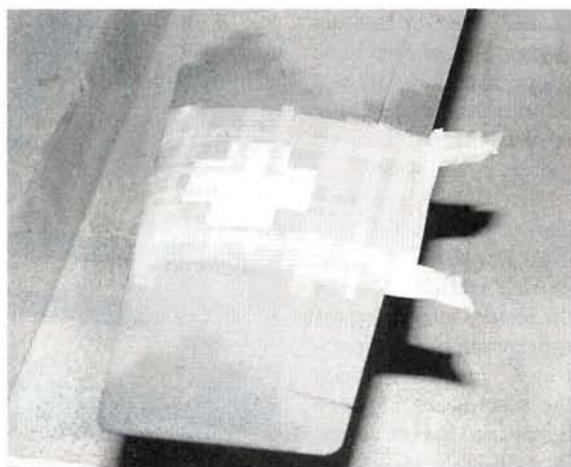
then progressively darker colors after that, with only few exceptions. This seems obvious but can mean challenges when masking. Planning ahead is crucial to success! On this model, I shot a patch of white anywhere that white occurred in the final scheme. Use at least a couple of coats, and paint well outside where the white will show.

Now mask anywhere there's white on the finished model. In photo 2, I'm cutting Maltese crosses from a stack of masking tape on a vinyl cutting mat. A printout of the insignia is laid over the tape and guides cutting. In photo 3, the masks are in place. Though the cross will only have thin, white lines inside a black field, mask the entire cross. Same goes for the rank chevron, *gruppe* bar and swastika. Notice careful alignment with the penciled panel lines.

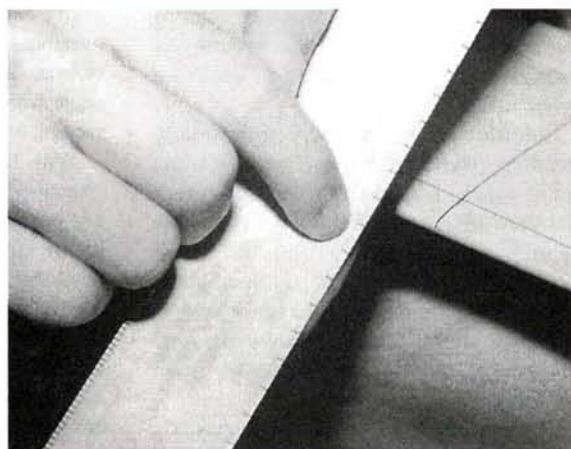
Never use the factory edge of the tape. Even if you're masking straight lines, cut the tape lengthwise with a straightedge so the edge is clean. This will leave crisp color separations.

Like most military aircraft, this scheme uses very light gray that covers the bottom surfaces of the airframe, the fin and about $\frac{2}{3}$ up the fuse-

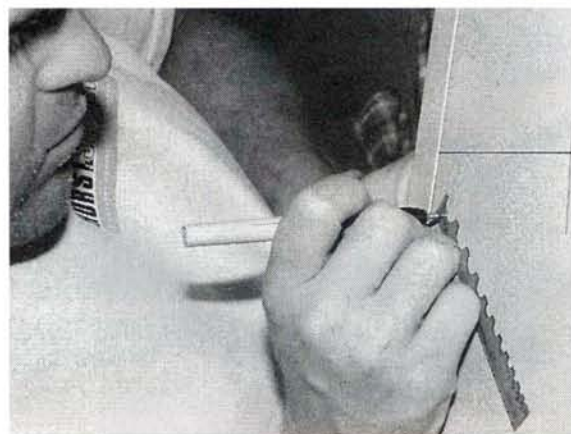
6 *With the white background painted, lay out the balance of the Maltese crosses so you can spray the black part of the markings.*



7 *An important tool when doing panel lines is a flexible, plastic straightedge. Apply a layer of masking tape to the back of the straightedge so that it's raised off the surface while drawing a line.*



8 *Cutting up drafting templates to use as pen guides produces some very useful tools for panel creation.*



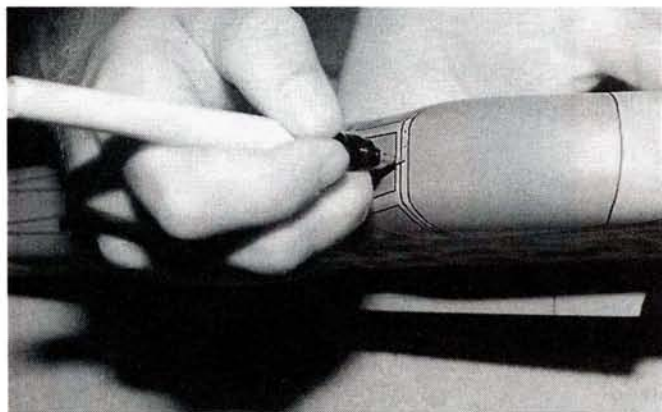
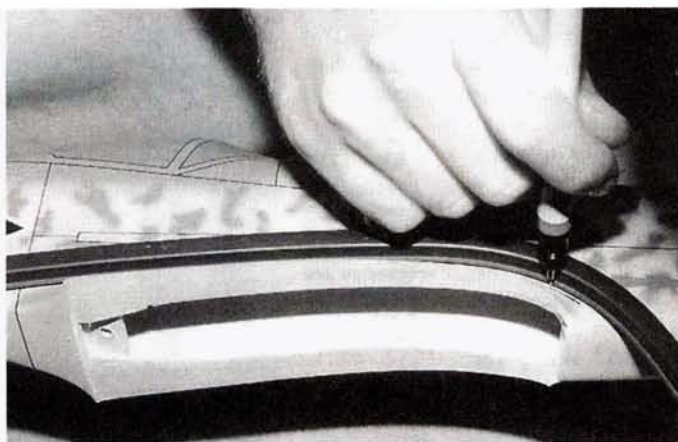
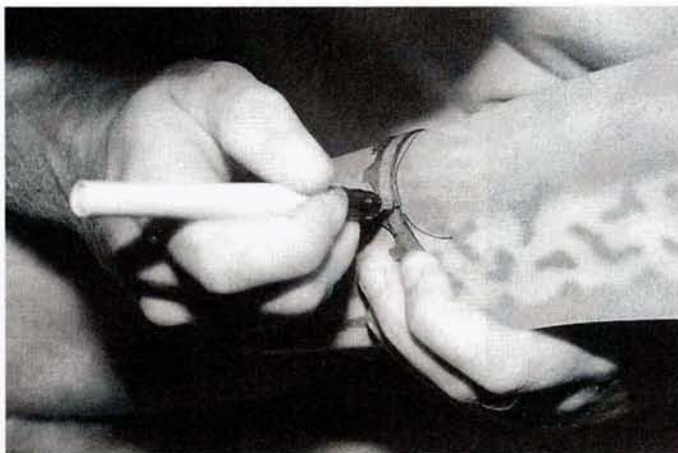
BASIC FINISHING TECHNIQUES

lage sides. Get coverage a little beyond where the darker colors overlap. Shoot the next darker color, the lightest of the camouflage colors on the upper surfaces. I freehand the color separation on the side of the fuse, but you can use a piece of card stock held $\frac{1}{2}$ inch or so away from the plane and shoot across it, too. This will still yield a nice fade-out edge. The wavy line at the fillet is also free-handed. Practice fade-out edges on white card stock to get a feel for it, and adjust the gun for best results. After you're in the groove, do the plane.

Next, shoot the dark camouflage and the mottling. In photo 4, I'm just getting started shooting the mottles after doing the splinter camo. On camouflage, carefully shoot the boundaries between lighter and darker colors, then fill in the rest. Photo 5 shows this. If the camouflage creeps from wing to fuselage, shoot it with the wings and fuselage joined to ensure a good match.

Mottles are something you definitely want to "warm up" to on a piece of white card stock. Experiment with different motions to get the effect you want. After you're "grooved in," shoot the plane immediately, while you've got the rhythm. Don't stop until the first coat of mottling is complete. It will look different every time depending on your beer or coffee level that day.

I shoot each color in two coats. It's



pretty easy to maintain control and not overshoot the first coat by using low paint volume. If you're lucky and get good coverage with the first coat, you won't need a second, but usually it takes two.

With basic colors complete, let's turn attention to the insignias. Photo 6 shows my procedure for Maltese crosses. Use square tape pieces to mask the inside corners, then mask the ends of the bars, and finally, use thin strips to mask the white lines. The previously masked-out white area defines the dimensions of the cross and serves as a masking guide. The strips are laid in a tic-tac-toe grid, then the middle square is carefully cut out, leaving four L-shaped legs. Use butcher paper to mask the rest of the plane so that no overspray gets on the camouflage, then shoot the black. On the fuselage, mask the white edges of

11 Rivets are easily simulated by stippling.

the rank and *gruppe* markings, too. I don't attempt to paint the black in the swastika on small models; I do that with ink while panel lining.

The spinner was completely masked during camouflaging, then a tape strip was spiral-wrapped around it prior to shooting the light blue. The white field of the *Udet Gruppe* badge was done the same and a carefully cut mask laid over it to shoot the red.

Now, there are exceptions to the "dark over light" rule. Canopy glazing is one. It's easier to mask the glazing boundaries than the glazed area itself. This necessitates shooting a light color over dark camou-

10 Here, a flexible curve tool is used to draw the fillet panel edge.

flage. For this, mask the glazing boundaries, then apply a coat of white prior to the final color, allowing it to dry thoroughly. Then you'll get good coverage with as few as two coats of the glazing color. The rust-colored exhaust stacks were done the same way. U.S. insignias are

another place where this technique is useful. Mask out the white star and bars, then shoot a patch of insignia blue over that. Next, apply a mask shaped like the blue outer boundary of the insignia, which stays in place until the plane has been completely painted.

After the model has dried thoroughly, wipe it down with a soft cotton cloth to knock down standing paint at masked edges and tiny flecks of dust. This is analogous to "sanding" but doesn't really cut the paint. It will buff to a very slight gloss during this procedure. After that, shoot one clear coat. With a couple more clear coats, you could be done. If you want to follow along for the panel lines, though, shoot one coat of satin, and let it dry overnight.

PANEL LINING WITH PENS

For the very best results, Rapidographs, or "technical" pens, can't be beat. These are fine instruments and come in a wide range of qualities and sizes. I use standard tungsten nibs on my pens, which work fine; you don't need the expensive jewel tips for this. My favorite ink is Higgins Black Magic, which really lives up to its name! It sticks well, is very opaque and dries quickly. It goes flat when dry, so it's easy to tell

THE BADGER MODEL 200 AIRBRUSH



when shooting primer but can still switch to a 1-ounce canister for shooting small details. In addition to this, it gives the gun a low center of gravity so that it rests easily in your hand, allowing you to relax. It's impossible to get a good finish if you're tensed up, worrying about spills, as you would be with a top-fed gun.

Second, it's single-action. This means the trigger button controls air only, and paint siphon-feeds from the canister. Double-action guns are far more difficult to get a "feel" for and are a lot of trouble to clean. The single-action gun can usually give a neophyte airbrusher good results since its operation closely resembles the spray cans he or she is graduating up

Over the course of the project depicted here, I had the pleasure of laying down paint with the Badger Model 200 Airbrush. For you total tool nuts, it's a bottom-feed, single-action, internal-mix gun.

This gun is well-suited to the aeromodeler's needs. First, it's bottom-fed, which allows you to use as large or as small a paint canister as you'd like. I typically will use a 6-ounce canister

from. The trigger-button spring tension is light but not sloppy, and I can paint for hours without getting a cranky trigger finger.

The gun comes stock with a large-gauge spray regulator tip, although Badger offers medium and fine regulator tips for very detailed work. So far, I've been able to get as fine a spray pattern as I've ever needed with the large-gauge tip while still being able to "open up" the gun and cover large areas if necessary.

Paint volume is controlled by a knob at the butt of the handle; this keeps your adjustment hand well away from the tip while you're adjusting the spray. This may seem trivial, but it only takes one episode of not noticing the errant paint on your finger from fooling with a tip-adjusted gun, then laying a big, fat fingerprint on your project to help you appreciate this feature! Adjustment is very silky and positive and stays correct with no tendency to "stray."

Fit and finish of all the components are absolutely outstanding, and the gun feels very nice in your hand. The chrome-plated head discourages paint adhesion, making it easy to clean.

Included with the gun is an excellent owner's manual that can get you off on the right foot, discussing adjustment, cleaning and maintenance, as well as techniques to achieve the best finish and effects. Also included are tips for thinning to allow the best results with a variety of media, as well as a troubleshooting section to help you target and correct common gun setup problems.

I found this gun a pleasure to use, and it has given me many hours of trouble-free use with virtually no maintenance other than regular cleaning. If you want a serious gun that will allow you to achieve professional-quality finishes, I'd highly recommend the Badger Model 200.

whether it's wet so you don't smudge it. The best part is water clean-up. And you can leave it in your pens for weeks without clogging.

Another important tool is a flexible, plastic straightedge. It will follow curved surfaces easily, and it won't mar your finish (photo 7).

Also used are plastic drafting templates. I'll often cut up templates

to make special shapes, such as the clipped circle template in photo 8 for the radiused corners of an access panel. These templates are very flexible and will pull tight curves (photo 9).

Notice in photo 10 that I'm holding the Rapidograph perpendicular to the work surface. The ink will not flow unless the pen's valve is opened by a fine wire at the center of the nib. This requires that the pen be kept perpendicular to the surface.

In photo 10, a flexible curve tool is used to draw the fillet panel edge. This drafting tool is very handy and can be bent into any

curve. Also visible are the painted exhaust stacks. After pen outlining, they will have a striking scale appearance, even though they're flat.

The more you paint, the better and quicker you'll get. Pretty soon, you'll be able to reproduce any scale color scheme you desire and replicate unusual markings you could never get on a decal sheet; plus you'll have the pride of saying, "It's paint! ... Every bit of it!"

Rivets are simulated by stippling (photo 11). I just eyeball the spacings by doing "landmark" rivets first, like the ends and center points of panel lines, then filling in with progressively tighter spacings. Don't go crazy, as overdoing rivets can spoil the scale illusion. Use them sparingly as a highlighting effect. Also, you can see that the canopy glazing is outlined, which really makes it "pop."

For radiused corners, the circle templates work well. Always do the corners first, then fill in the straight lines. This ensures the best straight-to-curve transitions.

During panel lining, keep a damp (not wet) cloth handy for wiping off the pen nib, tools ... and mistakes! If you catch errors quickly, you can "erase" with the damp cloth.

As a last step, carefully draw in the black part of the swastikas, leaving a thin band of white paint showing to create the outline.

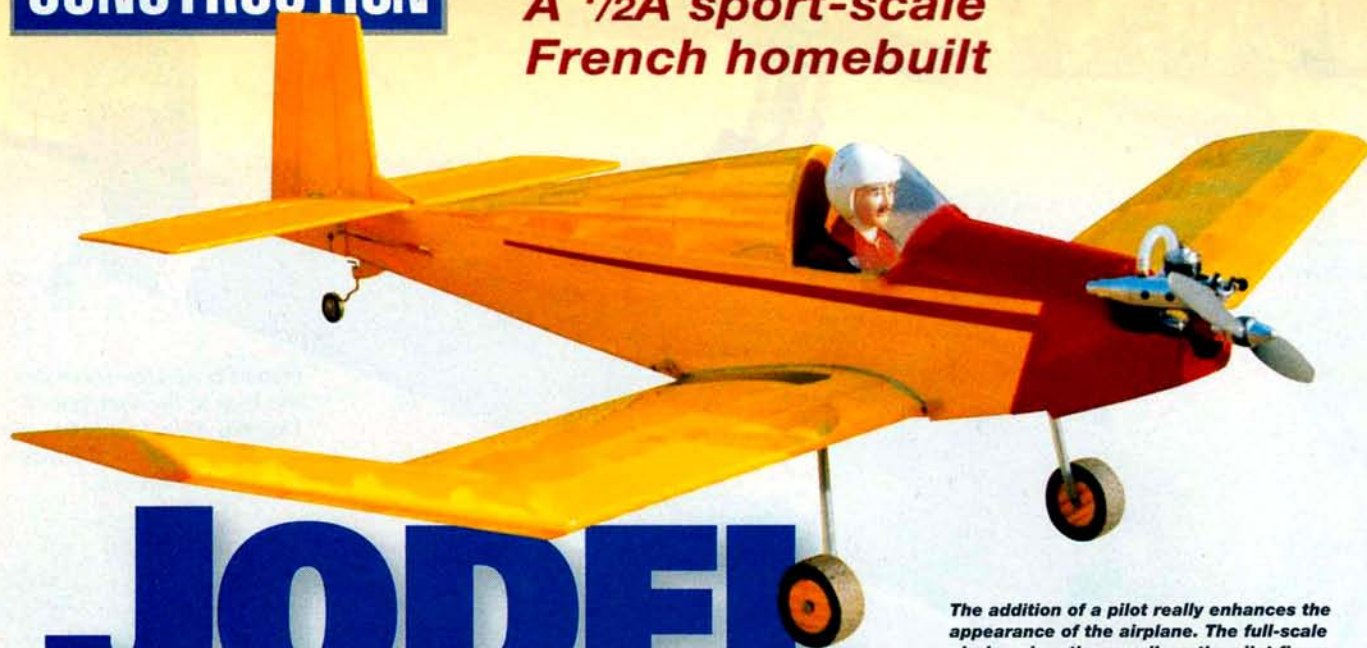
FINAL TOUCHES

Dust the model off, then shoot another clear coat. After curing, do the cotton cloth wipe-down, then shoot another coat or two. With a satin finish model, you're done! In the case of a gloss finish, buff it again with car wax after the clear coat has cured for a few days.

The more you paint, the better and quicker you'll get. Pretty soon, you'll be able to reproduce any scale color scheme you desire and replicate unusual markings you could never get on a decal sheet; plus you'll have the pride of saying, "It's paint! ... Every bit of it!"

*Addresses are listed alphabetically in the Index of Manufacturers on page 123.

A 1/2A sport-scale French homebuilt



JODEL BEBE

by RANDY
RANDOLPH

The addition of a pilot really enhances the appearance of the airplane. The full-scale airplane is rather small, so the pilot figure should be nearly tall enough to reach the top of the windshield.

MANY YEARS AGO, I joined the number of aspiring airplane jockeys with freshly obtained licenses to fly single-engine land airplanes. Once this new skill was learned, the desire to use it was strong. However, about the only way a guy with a day job and a family to support could fly was to rent an airplane, which took money! In fact, it cost as much for a hour in the air as it did to feed the family all week! Being a modeler with skilled hands and a creative soul, my only answer was to build an airplane. I dithered between a Jodel Bebe and a Fly Baby, which was my final choice.

While I was wrapped up in my project, one of my modeling buddies started work on a full-size Jodel. I remember visiting him once while he was deep into his project. At the time, the main wing spar of that Jodel extended from his garage, through his kitchen into the living room. (He must have had a most understanding wife!) It was then I remembered why I had opted for the Fly Baby with its folding wing.

Over the years, I have still retained a nice warm feeling for that little Jodel, and when I ran across a small 3-view while looking through some old magazines, I decided that the time had come to build one. Not the kind with the long built-up spar, but one suitable for a Cox* .05 R/C engine and a radio to direct its activities. The result is a gentle-to-fly, yet frisky, little airplane that looks great in the air.

Although the airplane appears to be close to scale, liberties were taken to produce a 3-channel machine with a roll rate that corresponds to the rudder input. I doubt that ailerons would have been any more effective, and they would



The instrument panel is simple to make, and the wing walk is no more than 400 wet-or-dry sandpaper epoxied to the top of the right wing. Opaque covering material would look more scale, but the author likes model airplanes that look like model airplanes!

PHOTOS BY RANDY RANDOLPH

certainly complicate an otherwise easy-to-duplicate design. The throttle response of the great little Cox .05 R/C provides true slow, cruise and high-speed flight that rivals the performance of much larger engines. However, a G-Mark .061 or Cox TD .049 with a cylinder and throttle sleeve from Ace R/C are very viable, substituted for the .05 R/C.

SPECIFICATIONS

Model: Jodel Bebe

Type: sport scale

Wingspan: 39 in.

Wing area: 265 sq. in.

Wing loading: 11 oz./sq. ft.

Weight: 21 oz.

Length: 31.5 in.

Engine req'd: .03 diesel; .049 to .09 glow

Propeller: 6x3

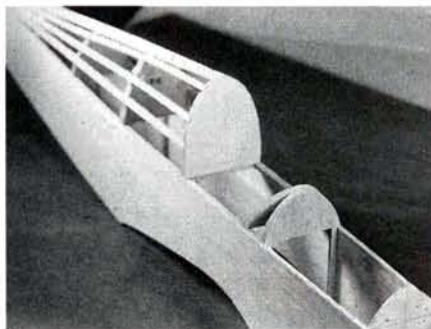
Comments: deviations from scale include additional dihedral and an enlarged fin/rudder to provide smooth lateral control without ailerons. The landing gear was lengthened slightly for better prop clearance.

CONSTRUCTION

It always seems like a good idea to start every project with the wings. Granted, the fuselage usually takes most of the time to build, but the wings are actually what generates flight.

Since all of the ribs in the center section are basically the same, they can be stacked and cut out on a band saw or a jigsaw. Six of them have an 1/8-inch notch for the landing-gear mount between the bottom-spar notch and the leading-edge notch. Four of these ribs have 1/16 inch trimmed from both top and bottom to make room for the center-section sheeting. Also, four center ribs have the main spar notch trimmed for the 1/16-inch plywood dihedral doublers.

Once the ribs for the tip panels have been cut, the trailing edge can be notched. Notice that the notches in the tip sections are slanted to match the ribs. Cut out the eight 1/16-inch plywood dihedral braces and build up the 1/8-inch plywood landing-gear mount.

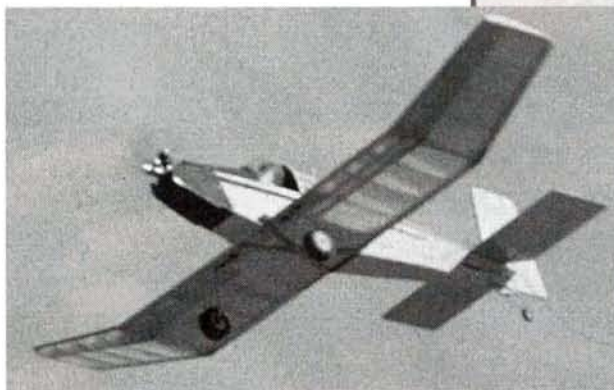


Once the sides have been joined by the fire-wall and headrest former, the tail can be brought together and glued. A smoother covering job results if the second aft turtle former is sanded between the stringers so the covering material doesn't touch the former.

The wing is built over the plan in the time honored fashion so don't forget to cover the plan with wax paper or clear plastic to prevent the completed wing from being glued to the plan.

Pin the main spar and trailing edge to the center section plan. Lay a couple of strips of 1/16-inch stock on the plan across the four center ribs. This will

ensure enough room for the bottom sheeting to fit between the spar and the trailing edge when the trimmed center ribs are installed. Make a gauge, as shown in the



In the air, the resemblance to the full-scale airplane is very good. It has good low-speed performance and is much more aerobatic than the full-scale machine.

plan, and use it to slant the two dihedral ribs. Glue only the very center of these ribs to the top of the spar, leaving room for the dihedral braces on each side. Add the leading edge and the two top spars and, when the cement has set, remove the center section from the plan.

Build each tip the same as the center section. Use the same dihedral gauge to slant the dihedral ribs and glue them only to the top of the main spar just as you glued the end ribs of the center section. Sand the spars and the leading and trailing edges flush with all of the end ribs. Block up each tip 3 inches, and join the tip panels to the center section with the plywood dihedral braces. There is a brace on each side of both top and bottom spars at each dihedral joint.

When the glue has set, add the bottom front spars and the 1/8-inch plywood landing gear mount; then sheet the center section. Notice that the sheeting butts against the spars and the trailing edge. Add the 3/32-inch soft balsa wingtips and sand the completed wing.

The stab, elevator, fin and rudder are all cut from medium 1/8-inch balsa sheet. Once the 1/8-inch plywood anchor has been inset into the fin and the 1/8-inch hardwood carry-through dowel has been epoxied into

FLIGHT PERFORMANCE

• Takeoff and landing

The wide landing gear and steerable tailwheel make the Jodel handle very well on the ground, but it is a good idea to taxi around a bit to get the feel of the airplane. Point it into the wind, advance the throttle and it will be airborne in 30 or 40 feet. After one trim flight, you will be completely at home with this airplane. Landings are very uneventful.

• Slow-flight performance

Assuming that you throttle the .049, the Jodel will slow down quite nicely. It is quite stable and must be made to snap.

Because of the light wing loading, it is much more responsive to bubbles in the air but usually recovers without much control input.

• High-speed performance

At full throttle, the Jodel is quite peppy and tracks well, even in a wind. It will do most maneuvers that can be done with a rudder/elevator plane—all without scaring you.

• Aerobatics

It is not an aerobat but it will loop and do barrel rolls and snap rolls. It will do a slow axial roll if you are patient, and it can even cruise around inverted. But the most fun are touch-and-go's with that nice working throttle on the .05 R/C.

One of the truly good pilots in our club remarked that it was the best flying small airplane he had ever flown—a rather high compliment indeed coming from that particular source!



Foam, shaped to be a little higher than the former and firewall, is added above the tank, so the turtle-deck sheeting will hold the tank firmly in place. Don't forget to connect the fuel lines before adding the sheeting.

the elevator LE, the tail surfaces are ready for sanding.

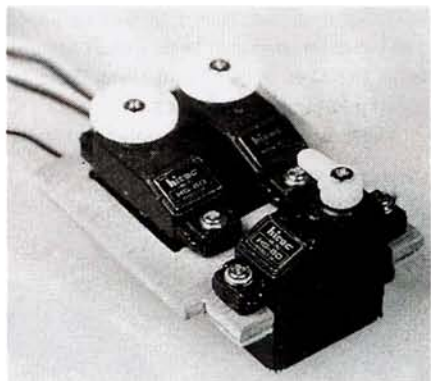
After the two fuselage sides have been cut from medium 1/16-inch sheet, the 1/8-inch square longerons should be cemented into place. The 1/16-inch doublers are snugged up against the longerons and epoxied into place, followed by the 1/64-

inch ply tripler and the 1/8-inch square uprights. The 1/8-inch square servo rails can also be added at this time. While the cement is setting up, cut out and drill the firewall, hardening the engine-mount holes with thin CA. Cut the formers F1 through F7 from 1/8-inch sheet balsa, noticing the grain. Those in front of the cockpit have the grain running horizontally while those aft of the cockpit have the grain running vertically. Glue the 1/8-inch square strips across the bottoms of formers 4 through 7, and cut bottom cross-pieces to match them. Bottom cross-pieces to match formers F2 and F4 are cut from 1/8x1/4-inch stock.

Using the formers F2 and F4 and their bottom cross pieces, join the two fuselage sides. Be sure that the formers and cross pieces are exactly at right angles to the sides. When the cement has set, epoxy the firewall in place and allow the epoxy to cure before beveling the sides at the tail and joining them to form the tail post.

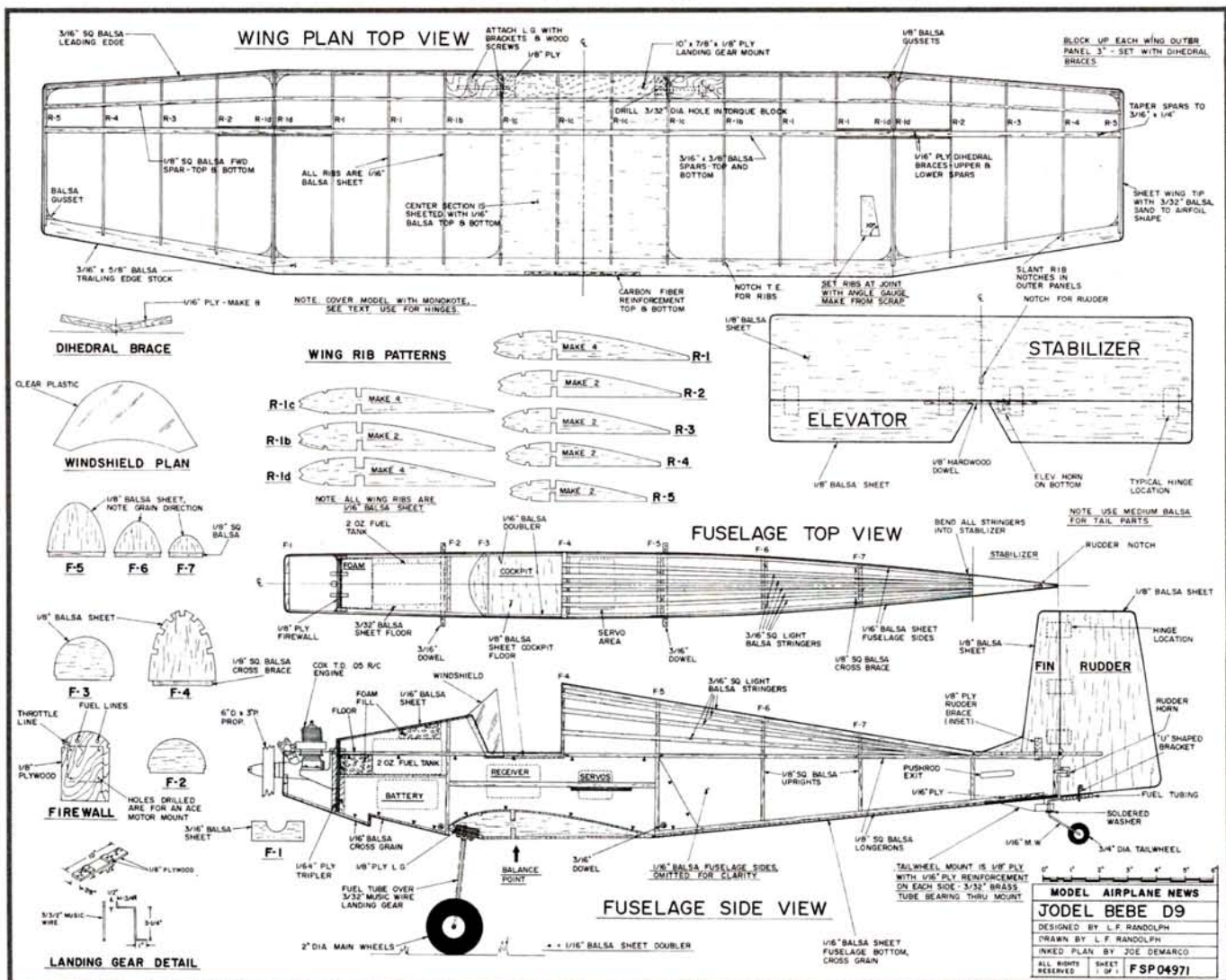
This is a good time to add the tank and cockpit floors.

Install all the formers and cross-pieces, and sheet the bottom of the fuselage with cross-grain 1/16-inch sheet. Notice that the



The servos are mounted in an 1/8-inch plywood tray. After the airplane is assembled, engine and battery installed, slide the tray back and forth along the mounting rails until the airplane balances at the point indicated on the plans.

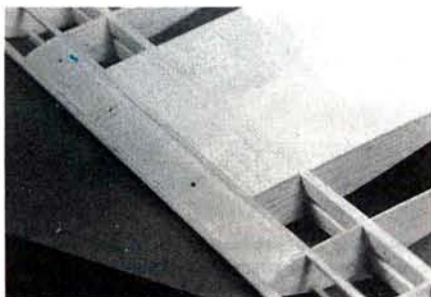
To order the full-size plans (FSP04971), see Pilots' Mart, page 121.



JODEL BEBE

last few inches of the bottom sheet at the tail is $\frac{1}{16}$ -inch plywood, which acts as a mount for the tail heel. Add the stringers aft of the cockpit by placing them in the notches in F4 and on top of the other formers. This way, the formers do not touch the covering material when it is added. Taper and bevel the stringers to fit solidly together at the stab mount, and sand them to blend into the fuselage sides.

There is room for a 2-ounce fuel tank,



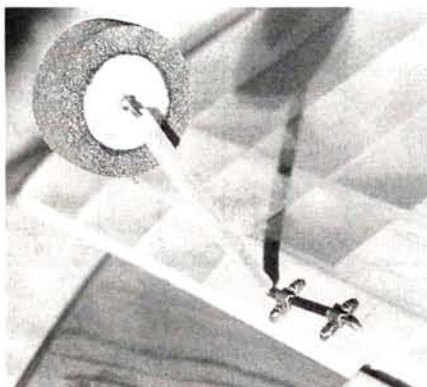
The $\frac{1}{8}$ -inch plywood landing-gear mount fits between the leading edge and the first bottom spar. It should be assembled and drilled before it's glued into the wing. This type of gear mount does a good job of absorbing the landing shock without transferring it to the main spar.

and it must be installed before the top sheeting can be added. Hold the tank away from the firewall with a block of foam. More foam should be compressed slightly against the top of the tank by the top sheeting. Run some inner Nyrod from the servo area through the firewall for a throttle, and connect the fuel and overflow lines; then add the top sheeting. Sand the finished fuselage.

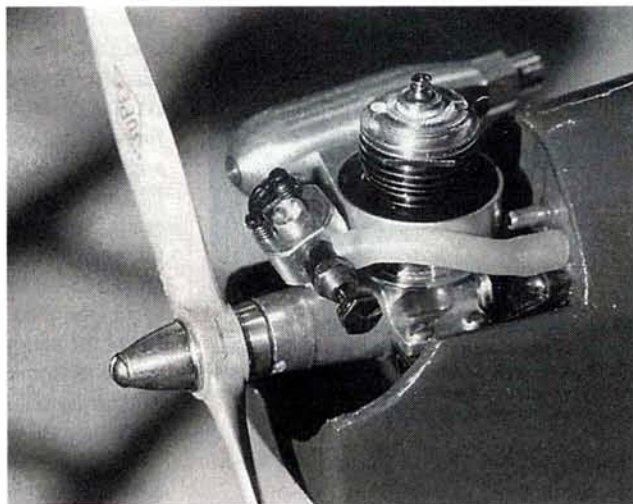
Since the D-9 is a homebuilt airplane and there have been many built, the color choice is up to you! Since I like model airplanes that look like model airplanes, I covered this one with transparent MonoKote* and used the same material to

hinge the control surfaces. Use Hobby Lobby* transparent Oracover (if you can find it) and you can see all of your good work! Drill the holes for the $\frac{3}{16}$ -inch dowels that hold the wing and epoxy them into place. The firewall should be fuelproofed by brushing on a coat of epoxy cement thinned with acetone. Brush the epoxy over the covering material where it overlaps the engine compartment to completely seal the edges.

Bend $\frac{3}{32}$ -inch wire landing gear to shape, and mount it on the wing with clips and small wood screws. Check to see that the axles are in a line and mount 2-inch wheels with soldered washers or wheel collars. Build up the tail wheel mount, or use a commer-



The $\frac{3}{32}$ -inch music-wire gear is mounted to the gear mount with clips and wood screws. Fuel tubing over the landing gear leg simulates the gear on the full scale Jodel.



The Cox .050 R/C is mounted on an Ace R/C mount. The throttle control in this installation is beneath the muffler. The throttle arm can be rotated 180 degrees so the throttle line can extend over the muffler to accommodate the servo throw direction, if necessary.

cial model, and bend the tailwheel axle from $\frac{1}{16}$ -inch wire. A $\frac{1}{32}$ -inch wire yoke captures the tiller through a length of fuel line. A lightweight $\frac{3}{4}$ -inch wheel completes the assembly.

Attach the engine mount to the firewall with wood screws and mount the engine. Install batteries and a receiver in the locations shown. Slip the servos into the plywood servo tray and slide it back and forth on the rails until the airplane balances at the place shown on the plans; then cement the tray to the rails and mount the servos. Connect the pushrods to the control surfaces and throttle, and check their direction of movement. Center the control surfaces while the transmitter trim tabs are centered, and the airplane is ready to fly.

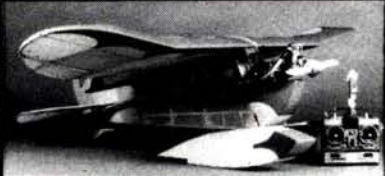
*Addresses are listed alphabetically in the Index of Manufacturers on page 123.

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PRODUCT REVIEW

by GERRY YARRISH

HAVING BEEN INVOLVED in giant-scale modeling for many years now, I have a great affection for gasoline-powered engines. I enjoy their user-friendly operation, inexpensive fuel and overall sturdiness. When first getting into giant scale, I, like many modelers,

have been very pleased with its performance, especially with its new IntelliSpark ignition system. Here's what I found.

Looking for a new engine to hang on my latest model, a Ziroli* Stearman PT-17, I wanted to try an engine with electronic ignition. I chose the new Quadra Q52XL available from North American Power R/C*. I've run the engine now for over 40 flights and

on my Stearman's firewall and provided a big reserve of power for my 18-pound Stearman.

The carburetor on my engine is the standard Walbro variety, but the engine also comes equipped with the nearly identical Zama carb. In place of the large flywheel/magneto, the XL has a cone-shaped metal extension that houses the Hall effect timing magnet. The pick-up comes wired with a 10-inch-long wire lead ending with a Deans connector. The pick-up is secured to the crankcase with a bracket that's held in place with one of the crankcase bolts. The anodized prop adapter is attached to the extension with three 10-32 bolts, and the prop is held securely with a single center bolt. The exhaust port is directly opposite the carb in a side-exhaust layout.

The engine comes with a cast aluminum mount that's secured to the case with four bolts. For my installation I removed the stock engine mount and installed a 1/4-inch-thick aluminum plate measuring about 4 inches square. This brings the engine closer to the firewall for a more scale appearance. The only other modification I made to the engine was to silver-solder a stainless-steel extension to the stock throttle arm. This allows

more throttle servo travel and a finer throttle resolution. Mounting the engine with the aluminum plate and the extended throttle arm was very simple and straightforward. Four 1/4-28 bolts hold the engine firmly in place, and a simple direct connection to the throttle arm using a Sullivan* Gold-N-Rod and a Rocket City* ball link completes the simple attachment setup.

INTELLISPARK IGNITION

The heart of the Q52XL is its IntelliSpark ignition system. This microprocessor-based electronic ignition system provides the computer equivalent of an adjustable centrifugal spark advance system to obtain optimized power output. North American Power R/C states that the ignition module has a feature called "adaptive prediction" that calculates

Quadra Q52XL & IntelliSpark Ignition System

was cautious about using big gas engines. I had heard that with their magneto-driven ignition systems, gas engines could cause radio interference. Since then, however, I've learned that as long as you use a resistor spark plug and install and maintain the engine properly, this is simply not true. In fact, I have used magneto-driven engines for most of my models and have never had a radio glitch that could be traced back to the engine.

The Quadra Q52XL with IntelliSpark ignition is a reliable, powerful engine in a relatively small size.

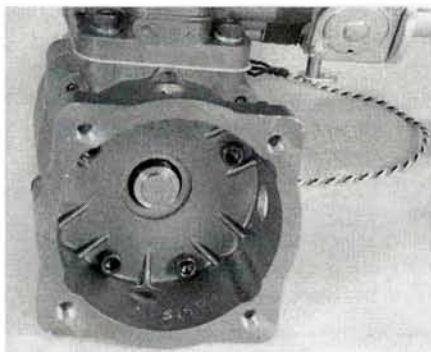
THE ENGINE

The Quadra Q52XL is a compact powerplant that puts out considerable power for its size. The XL has 3.19ci (52cc) of displacement and produces approximately 4 1/2hp. The XL is a cosmetically and performance-enhanced version of the popular Q-52S magneto-driven engine and is approximately 1 pound lighter than the S version. The XL comes with the IntelliSpark ignition system, and this accounts for its lighter overall weight (no flywheel/magneto). Its overall dimensions (7 5/8 inches high x 5 inches wide x 6 inches long) put the Q52XL in the 2.5ci engine-size ballpark with only a slightly larger mounting footprint. I found the Q52XL fit perfectly

A powerful combination with simple timing adjustment



The IntelliSpark ignition module comes ready to plug and play. It can be mounted using screws or simply wrapped with foam and stuffed into a convenient space.



The cast-aluminum engine mount comes already attached to the engine and provides a solid attachment base.

and adjusts the ignition timing requirements for the engine at any given rpm, hundreds of times per second. This feature eliminates the uneven throttle response associated with other electronic ignition systems. In practice, I found the throttle response, after the engine had been idling and warmed up a bit, very smooth and immediate. There's no lag between pushing the throttle stick quickly forward and the engine responding. In the air, this equates to having very precise throttle control without any dead areas in the throttle stick travel.

The IntelliSpark system also (along with its optional Command & Control [C&C] hand unit) allows timing adjustment in two separate power bands while the engine is running. This makes it very easy to adjust the engine. The engine is very easy to start, typically on the first flip of the prop after choking, and has a smooth idle. At the same time, transition to full power remains smooth and constant.

The system has a very low battery current draw and will last almost an hour on as little as 250mAh. I typically run an 1100mAh pack, and this is good for an entire weekend of flying on only one charge. For safety I use a standard JR* giant scale radio switch/charge jack harness mounted in the front cockpit of the Stearman. This allows easy access away from the prop and a direct way of charging the ignition battery pack. The jack for the C&C unit and the red ignition indicator LED are also located in the front cockpit. Another welcome feature is that if the engine stands dormant for more than 30 seconds, the ignition system automatically switches to a "sleep" mode and shuts off power to the spark plug. This practically eliminates any chance of an unintentional engine start by simply moving the prop.

COMMAND & CONTROL

Though the IntelliSpark system can be used as is on the Q52XL (or any other gasoline

engine, for that matter), the C&C unit is what makes full access to all of the features available with the IntelliSpark. Coming from the ignition module case are six leads: the spark plug lead, a braided ground wire, the battery power lead, the sensor pick-up lead, the ignition indicator LED lead and the hook-up lead (with jack) for the C&C hand unit. The only problem I had installing the unit in my model was that the ignition indicator LED lead was only 2 inches long. This made installing the LED on the exterior of my wide-bodied Stearman very difficult. I eventually soldered a 3-inch extension to the lead to increase its length. NAPR/C told me that all future units would have longer lead wires.

The C&C unit simply plugs into the module's jack (the hand unit comes with a 36-inch lead) and is ready to use. On its face, the C&C unit has a program LED and three small buttons: INC (increase), DEC (decrease) and STO (store). Within the

unit, there is also a beep alarm that's used to indicate its use. Here's what it does.

By plugging the C&C unit in you can:

- While it is still running, advance or retard the timing of the engine in 1-degree increments.
- Adjust the timing over two power bands, (5,850rpm and below to 1000rpm and 5,850rpm and above).
- Store new timing settings and recall their values.
- Retrieve maximum rpm data from your last flight (if you do not turn the ignition system off first).
- Return the timing setting to factory defaults.
- Do a diagnostic check every time it is switched on. The Hall effect pick-up can also be checked.

What all this does for the modeler is that the IntelliSpark ignition system makes

SPECIFICATIONS

Displacement: 3.19ci (52cc)

Weight: 4.1 lb.

Max. static rpm: 6,700

Idle rpm: 1,900

Horsepower: 4.5 @ 7,000rpm.

Prop req'd: 20x10, 20x12

Prop used: Menz* 20 x 10

Muffler included: yes.

Price: \$495 (includes IntelliSpark ignition system)

IntelliSpark Ignition System

Advance adjustments:

0° to 55° BTDC (depending on engine rpm)

Default settings:

under 1,000rpm, 2° to 4° BTDC

Mid range (1,000 to 5,850rpm), 32° BTDC (adjustable 19° to 36°)

High range (5,850rpm and above) 34° BTDC (adjustable 19° to 55°)

Operating voltage: 4.8 to 6.4 volts

Current consumption:

50mAh @ rest (Sleep Mode)

100 to 125mAh @ idle,

195 to 200mAh @ 6,800rpm.

Engine test timing settings

Mid range 30° BTDC

High range 32° BTDC

Engine rpm (with tachometer):

6,700 w/Menz 20x10 prop

IntelliSpark C&C rpm readout:

6,696rpm

Engine rpm range: 0 to 20,000

Spark-plug gap: 0.018 to 0.035 in.

Spark voltage: 30,000 volts minimum

Sensor/magnet gap: 0.020 to 0.035 in.

Price: \$149.95 (C&C unit \$39.95)

Features: the Quadra Q52XL engine with the IntelliSpark ignition features lighter weight than the magneto-driven Q52S engine and an increase in power output. The engine comes with the IntelliSpark ignition system, instruction booklet, resistor spark plug and spark-plug wrench, a cast-aluminum engine mount and a muffler. The prop adapter has an anodized finish and uses a single prop bolt.

Comments: the Quadra Q52XL is a powerful and reliable power system for aircraft weighing 18 to 25 pounds. The Quadra Q52XL has a full two-year factory warranty, and the IntelliSpark system has a 90-day warranty. Its overall size puts the Q52XL in the 2.5ci engine-size ballpark, so it's a good choice for modelers wanting to upgrade their aircraft's engine for more power (it fits into tighter cowls). For more thrust, a 22x6/10 prop can also be used.

Hits

- Reliable idle.
- Easy starting.
- High power output.
- Adjustable timing.
- In-flight engine rpm recall.

Misses

- On test unit, the ignition indicator LED lead was only 2 inches long, making external viewing of the LED difficult. (The factory has increased the length of the lead for all future units.)



THE C&C HAND UNIT

Though the IntelliSpark ignition module can be used as is, using it with the optional C&C unit allows various information to be retrieved and adjustments to be made to the engine timing. Here's how the C&C unit works.

Note: all adjustments to the timing are performed in the Run Mode when the engine is running and the ignition system is operating.

In the Run Mode

- Plugging in the C&C unit and turning on the ignition makes the LED flash twice, indicating the unit is on and has performed a self-diagnostic check.
- Pressing INC increases the timing setting 1 degree every time it is pressed, DEC decreases the timing setting in the same way, and pressing STO saves your new setting.
- To prevent the engine from overheating, the PRG (program) LED flashes when you've reached the upper and lower timing limits for the current rpm range.
- You can enter the Sleep Mode by depressing the STO button 10 times. This is a safety mode in which no power is

delivered to the engine and you can view all the readout settings.

Note: with the C&C unit plugged in, the ignition (IGN) LED attached to the IntelliSpark module flashes when the engine is running in the mid-range (1,000 to 5,850rpm) and is on continuously in the power-range (5,850rpm and above).

In the Sleep Mode

- Depress and hold the STO button and slowly rotate the prop. The unit beeps every time the magnet passes over the Hall effect sensor. (Do this only in the Sleep Mode.)
- Pressing the DEC displays the mid-range timing setting (below 5,850rpm to 1,000rpm)
- Pressing the INC button displays the high-range timing setting (above 5,850rpm).
- Pressing both the STO and the INC buttons at the same time displays the maximum in-flight rpm achieved.
- To reset the timing to the factory default, turn off the ignition system, depress INC, DEC and STO at the same time, and while holding them all down, turn the unit back on. To make the setting permanent, press the STO button once again.

Timing setting: **22° BTDC**

Readout: **2 flashes • beep • 2 flashes • beep at end**

RPM setting: **6696 rpm**

Readout: **6 flashes • beep • 6 flashes • beep • 9 flashes • beep • 6 flashes • beep at end**

Flashes represent numbers.

Beeps represent, spaces, end of readout and 0.



Shown here in the front cockpit of my Stearman are the ignition jack and the ignition indicator LED. The C&C hand unit has a 36-inch-long lead.

enjoying your gas-powered model simple. Just adjust for maximum power and forget it. Engine starts are easy and there's no fear of screwing up the timing settings. Also with the rpm-recall feature, you in essence have an in-flight monitoring system that helps you to choose the best propeller for your model's requirements. No more guesswork about how much the engine unloads and how much more prop

you can pull. Isn't technology wonderful?

Whether you're into giant-scale racing, IMAC competition, or heavy metal warbird fly-ins or are a serious sport flier, the Quadra Q52XL with the IntelliSpark ignition system offers you simplicity, flexibility and a reasonable price. What more could you ask for?

*Addresses are listed alphabetically in the Index of Manufacturers on page 123.

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*A solid
and precise
sport-pattern ship*



by MIKE DeHOYOS

THE TSUNAMI from Direct Connection R/C* is a .40-size, sport-pattern airplane of all wood construction. I was looking for a high-performance model, and the Tsunami had many features that attracted me. The Tsunami can be a red-hot sky rocket or a tame, Sunday flyer all depending on the size and type of engine you use and the amount of throw you dial in to the control surfaces. For me, an O.S.* .46 and the recommended throws gave all the performance I was looking for. Also, not requiring retracts, the model remains lightweight and uncomplicated. Here's what the Tsunami has to offer.

DIRECT CONNECTION

TSUNAMI

THE KIT

The balsa is of excellent quality and free of imperfections. The hardwood parts, including all plywood pieces are of good quality. The landing gear wires are pre-formed, and the hardware supplied with the kit is more than adequate. I found the instruction manual clear and to the point. Computer generated plans are also included and are easy to follow and very detailed.

TAIL FEATHERS

The stabilizer parts come pre-cut, with the exception of the leading edge and ribs. An 1/8-inch-square spruce spar adds strength to the assembly. I pinned the parts over the plans and cut the LE halves to fit before gluing with thin CA. The elevator halves are joined with a wire joiner. I pinned the elevator halves over the plans and marked the joiner's location. I then drilled oversize holes in the elevator's LE

and glued the joiner wire into place with 15-minute epoxy. Place the elevator on a flat surface and place a straightedge along its LE to keep it true until the epoxy has cured.

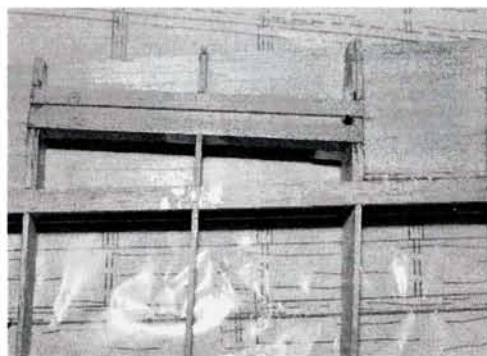
The fin is one of the easiest I have ever built. It's a matter of simply pinning the pre-cut parts to the board and gluing them together with thin CA. There's a 1/4x3/8-inch spruce post that runs along the fin's trailing edge, and this adds strength where

it's needed. Slotting this post to accept the hinges did not present a problem; I used a Dremel* Moto-Tool with a thin saw blade.

FUSELAGE

The fuselage is a simple box construction. Each fuselage side is made up of a front and rear piece that are glued together to form the finished side. Use a straightedge to align the top edges of these parts while you glue them together. Once the sides were dry, I marked the engine's thrust line on the inside surface of each side as described in the manual. This is important in aligning the firewall later in the construction. I then installed the $\frac{1}{4} \times \frac{1}{8}$ -inch stringers, $\frac{1}{4}$ -inch-square former stringers and the $\frac{1}{16}$ -inch wing-saddle doubler. I glued in the wing-saddle doubler with white wood glue to get a good bond across the entire surface.

The fuselage below the turtle deck has only three formers: F-1, the former behind the spinner ring; F-2, the firewall; and F-3, the former at the wing's LE. Before installing the firewall, I drilled the holes for the throttle linkage and the fuel line and I installed the T-nuts for the engine mount. Once I had installed the formers and glued the fuselage tail ends together, I glued the top and bottom sheeting into place. The front of the fuselage gets its shape from separate balsa sheets glued to form an octagonal cross-section between formers F-1 and F-3. Sanding this section with a long sanding bar to blend into the ply spinner ring produces the pleasing shape of the model's nose. The last task in building the fuselage is adding the built-up turtle deck and sanding the fuselage to its final shape.



The wing is straightforward and easy to build. Being a tail-dragger, the Tsunami has the main landing-gear mount blocks in the wing's sheeted LE area. Ply doublers strengthen the supporting ribs.

THE WING

The fully symmetrical wing is fairly conventional in design, except for the shear webbing. Instead of using the vertical-grain balsa-sheet method so common in kit planes today, the Tsunami uses a truss method consisting of lengths of $\frac{3}{16} \times \frac{1}{4}$ -inch balsa

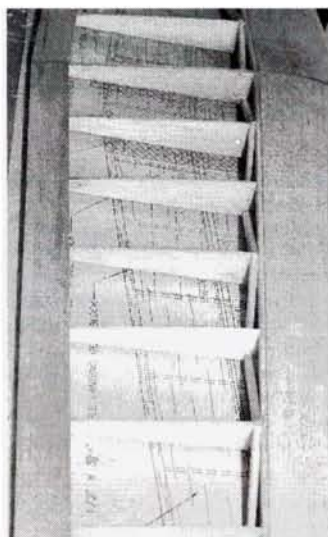
sticks. These braces are glued to the aft side of the spar between the ribs in a zigzag pattern. The end result is a lightweight, strong wing. Standard grooved hardwood landing gear blocks support the fixed landing gear. Plywood doublers strengthen the ribs supporting the block, and I've found the design quite strong. The stock setup for the Tsunami's strip ailerons is to use a torque wire arrangement and a single servo mounted in the middle of the wing. I prefer to mount two servos (one out in each wing panel) and run them independently so I can mix the two channels

together. Also, the short aileron pushrods minimize control-linkage slop.

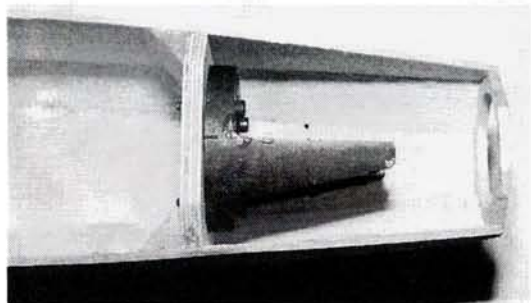
FINAL ASSEMBLY

I assembled the stab, fin and wing according to the instructions, making sure they were aligned properly. The powerplant I picked for this project is the O.S. .46 SF. Installing

Fuselage construction is simple and uncomplicated. In fact, there are only three formers in the entire lower section of the fuselage (below the turtle deck). It's recommended that you drill all the holes in the firewall (F-2) before you glue it into place.



The Tsunami has an unusual shear webbing design. It uses a stick truss construction instead of the common vertical-grain balsa sheeting. The design is strong and lightweight.



SPECIFICATIONS

Name: Tsunami

Manufacturer: Direct Connection R/C

Type: sport/pattern

Wingspan: 58.5 in.

Length: 50 in.

Wing area: 547 sq. in.

Weight: 5 lb.

Wing loading: 21.6 oz./sq. ft.

Airfoil: fully symmetrical

Radio used: Futaba 7-UAP w/S148 servos

Radio req'd: 4-channel (rudder, aileron, elevator and throttle)

Engine used: O.S. .46 SF

Prop used: Master Airscrew* 11x5

List price: \$84.95

Features: the Tsunami has conventional, all-wood construction, and the kit has a complete hardware package and a clear plastic canopy. The landing gear come prebent, and all the wood parts are cut and machine sanded. The kit also includes illustrated instructions and easy-to-understand computer-drawn plans.

Comments: the Tsunami builds light and is very strong. Much thought has gone into its design to simplify its construction. Its flight performance is very precise and it feels like a much larger model in the air.

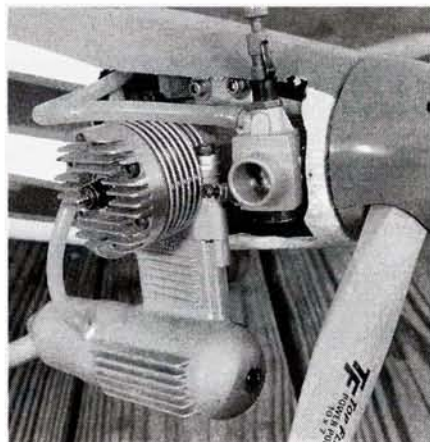
Hits

- Strong, lightweight construction.
- Clear and concise instructions.
- Excellent flight performance.

Misses

- Slight amount of roll coupling in knife-edge flight.

the engine is a snap after the opening for the engine has been cut out. Be sure you fuel-proof the engine compartment with thinned epoxy resin. Radio installation is straight-



The O.S. .46 engine fits snugly into place. Everything is in easy reach and the fuselage blends nicely into the spinner.

TSUNAMI

forward, and there's plenty of room to install everything. I used a Futaba* 7-UAP with standard S148 servos.

The manufacturer's recommended control throws are:

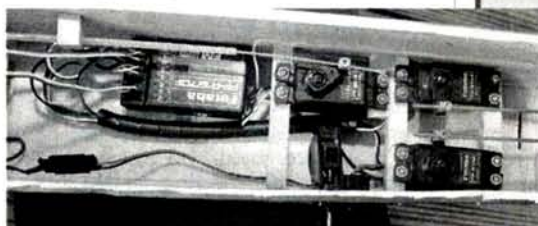
Ailerons: $\frac{5}{16}$ inch up and down.

Elevator: $\frac{3}{8}$ inch up and down.

Rudder: 1 inch left and right.



The only modification I made to the model was to install individual aileron servos out in the wing panels. This gives more versatility when using a computer radio.



Nothing unusual here; there's plenty of room for any radio system you'd like to use.

FINISHING

I sanded the entire plane with 150-grit paper and gave it a coat of Coverite* Balsarite before covering the airframe. I chose Coverite 21st Century fabric because I like the way this material goes on and how easily it conforms to curved surfaces. Once the airframe had been completely covered I trimmed the clear canopy to size, screwed it into place and added all the hardware and the landing gear. I used Du-Bro* Feather Lite wheels.

OVERVIEW

The Tsunami kit gets an A+ for design, ease of construction, instructions and the quality of the materials. Its flight characteristics are

FLIGHT PERFORMANCE

by ROGER POST JR.

A 5-pound airplane, a ball-bearing O.S. .46 engine and a nice clear day with no wind; what more could you ask for? After a check of the control surface throws and balance and an engine run-up, we were ready to fly.

• Takeoff and landing

The plane taxied into takeoff position quite easily—a definite plus on our less than smooth field. The takeoff run required some right rudder to keep it tracking straight, and after about 75 feet, the Tsunami rotated smoothly with slight up-elevator input. Throttle setting was slightly more than $\frac{1}{2}$. The plane's climb-out was as stable as could be with no hint of positive or negative pitching. Once in level flight, a slight amount of left aileron was needed to maintain straight and level.

Landing the Tsunami can be akin to landing your .40-size trainer. With the throttle reduced and some up trim added to relieve the elevator-stick backpressure, the Tsunami slows down considerably and can accomplish the smoothest of three-point landings. With a little practice, you'll grease in your Tsunami every time. If you happen to have a flame-out, no need to worry. Just trim for best glide and bring the Tsunami in for a smooth landing.

• Low-speed performance

Pull the throttle back to idle, add in some up-trim, and the Tsunami will slow to a crawl in the sky. You'll have a moderately high angle of attack, but the Tsunami handles superbly in this configuration. All three control surfaces remain effective right up to and through the stall. The power-off stall results in a slight drop of the nose with no snapping tendencies.

• High-speed performance

With full power applied, the Tsunami flies as if it were on rails. This is a point-and-go airplane, and it will change its direction only when you tell it to. Its vertical performance is sensational. A reduction in throttle is necessary for achieving the power-on stall. The result of the stall is that the Tsunami just falls forward and continues to fly when the backpressure is relieved.

• Aerobatics

If you can move the sticks for a particular maneuver, the Tsunami will do it. With its stay-where-you-put-it flying characteristics and the powerful O.S. .46 up front, there's no limit to the Tsunami's aerobatic abilities. Spins, rolls, loops, wingovers, stall turns and the like are effortless for this plane. Roll over to inverted, add some down-trim, and the Tsunami will fly perfectly level, "hands-off," for as far as you can see. I particularly enjoyed its knife-edge capabilities. When the rudder was introduced into the knife-edge flight, there is a slight amount of roll coupling, but nothing very difficult to deal with. When coming out of a spin, the Tsunami stops its rotation the second you return the sticks to neutral.

The Tsunami has to be one of the best flying planes, if not the best, I've tested to date. I highly recommend it to any flyer who's a novice or better.

very precise and a step up from your average sport model. In the air, it feels much larger than it actually is. Set up as the instructions say, you'll be very happy with its performance. I now have a bunch of friends want-

ing to buy my new favorite airplane. They can wait!

*Addresses are listed alphabetically in the Index of Manufacturers on page 123.

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Kyosho; distributed by Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.



GUILLOW'S Douglas DC-3

This 1/32-scale display model has a 35 1/2-inch wingspan and features Eastern Airlines decals as seen on the famous DC-3 on display at the Smithsonian Institution. As an extra value to the detailed plastic parts and movable surface construction, this kit also includes the decals needed to build a WW II C-47 transport.

Part no.—804; **price**—\$26.

Guillow's, P.O. Box 229, Wakefield, MA 01880.

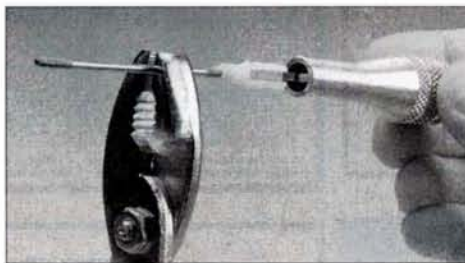


GREAT PLANES East Sport 60

This kit features interlocking, self-aligning, die-cut wooden parts and shaped and notched trailing and leading edges. The easy-to-handle model tracks well and can perform advanced aerobatics. Specifications: wingspan—66.5 inches; wing area—944 square inches; weight—6.5 to 7.5 pounds; length—57 inches; engine required—.60 to .90 2-stroke or .70 to 1.20 4-stroke; radio required—4-channel with four servos.

Part no.—GPMA0152; **price**—\$159.99.

Great Planes Model Mfg., 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.



GREAT PLANES Clevis Installation and Adjustment Tool

This tool works just like a ball end tool but is designed to make turning clevises easy. Its small size allows flyers to perform clevis installation and

adjustments right inside the fuselage. This handy, compact accessory easily slips over the clevis and fits most sizes of plastic and metal clevises. It also features an enlarged knurled handle that's easy to grip.

Part no.—GPMR8030; **price**—\$11.99.

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Part no.—HAN129; **price**—\$59.99.

Hangar 9; distributed by Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511; website www.horizonhobby.com.



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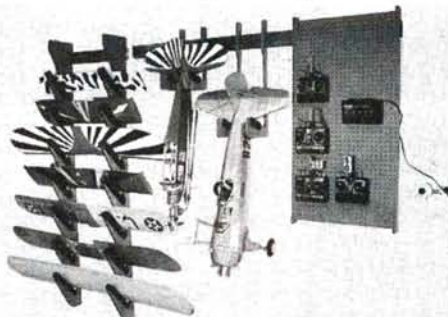
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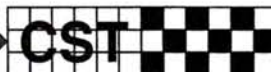
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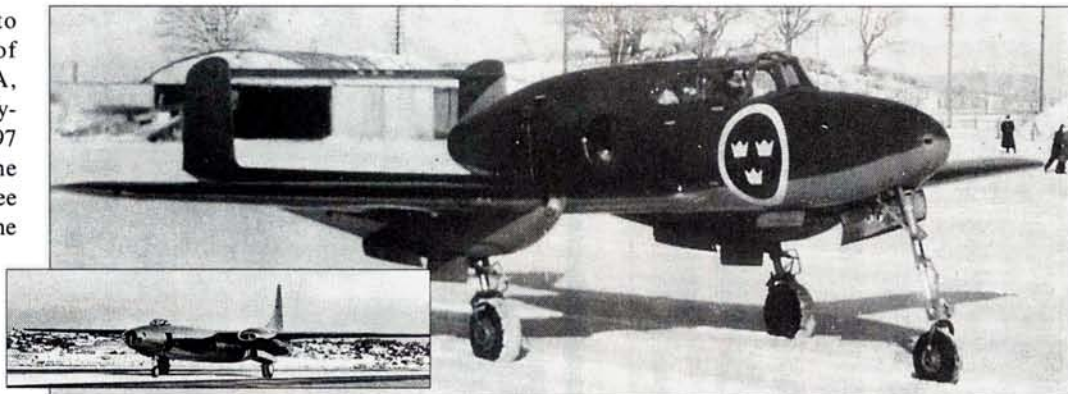


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Congratulations to Don Davidson of Walla Walla, WA, for correctly identifying the January 1997 mystery plane. The Consolidated-Vultee XB-46 shown in the photo was successfully finishing taxi tests at Lindbergh Field in San Diego, CA, in 1947.



Operated by three crew members and powered by four General Electric J-35 jet engines, the bomber was 105 feet, 9 inches long, 27 feet, 11 inches high and had a 113-foot

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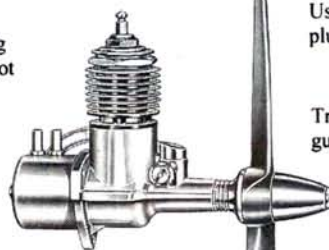
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HOBBYIST

MAGAZINE BACK ISSUES—

American Modeler, American Aircraft Modeler, Aeromodeller, Model Airplane News, Model Aircraft, RCM and more; 1930s–1990s. For list, send SASE to Carolyn Gierke, 1276 Ransom Rd., Lancaster, NY 14086. [4/97]

WANTED: Old, unbuild, plastic model kits from '50s and '60s. Send list, price to Models, Box 863, Wyandette, MI 48192. [3/99]

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of old model airplane motors, kits, books, magazines, toys, pictures, manuals and more. Send SASE for information. Ben LeValley, RT 3 Box 4868, Galena, MO 65656. [7/97]

WANTED: Built or partially built scale Cessna 150, 152, or 172. Glen Mills, P.O. Box 3393, Mission Viejo, CA 92690; phone (714) 768-0585; fax (714) 458-6455. [7/97]

WANTED: 1950's Berkeley Tri-pacer kit, larger model with a 44-inch wingspan. Write: Pat Murphy, P.O. Box 411, Sussex, WI 53089-0411; or call (414) 538-4437. [4/97]

WANTED: Model engines and racecars before 1950. Don Blackburn, P.O. Box 15143, Amarillo, TX 79105; (806) 622-1657. [10/97]

FALCON 880 NIB: \$325. Hobbie Hawk Original 1970's with box & extras \$325. Shipping extra. Vern Sundstrom; (815) 633-4236. [6/97]

ENGINES: IGNITION, GLOW, DIESEL—new, used, collectors, runners. Sell, trade, buy. Send \$3 for huge list to Rob Eierman, 504 Las Posas, Ridgecrest, CA 93555; (619) 375-5537. [5/97]

MODEL AIRPLANE NEWS, 1930–1980; "Air Trails," 1935–1952, "Young Men," 1952–1956; "American Modeler," 1957–1967; "American Aircraft Modeler," 1968–1975. \$1 for list. George Reith, 3597 Arbutus Dr. N., Cobble Hill, B.C., Canada VOR 1L1. [3/97]

CASH FOR ENGINES: ignition, glow, diesel—all types; any condition; sale list, too! Estates my specialty! Send SASE for list. Bob Boumstein, 10970 Marcy Plaza, Omaha, NE 68154; (402) 334-0122. [5/97]

O.S. 91 DUCTED-FAN ENGINE, Dynamax fan, Mac tuned pipe, never used, in boxes, all for \$425.00. (313) 662-2496 after 5 p.m. [5/97]

BYRON'S RV-4 NIB: Call, make offer. Bryan (801) 627-4431. [5/97]

WANTED BOOK: Model Airplane Design and Theory of Flight. Charles H. Grant. I will send dollars check. Abraham Chavez, Apartado Postal 6-12 Buenavista, Cuernavaca, Morelos 62131 Mexico. [4/97]

WANTED: Ace Rudder only Commander Pulse Transmitter, Commander Receiver with standard or Stomper Actuator. Dead batteries OK. Must be complete, undamaged and working. Herman Erhart, 2200 Monroe St. #404, Santa Clara, CA 95050. [4/97]

WANTED: TOY OUTBOARD BOAT MOTORS. Johnson, Mercury, Orkin, Fuji, Scott, Oliver, Evinrude, Gale Sovereign, Sea-Fury, Super Tigre, Lepage Monteleone. No plastic motors wanted. Gronowski, 140 N. Garfield Ave., Traverse City, MI 49686-2802; Ph. (616) 941-2111. [5/97]

EVENTS

MARCH 29—ROANOKE, VIRGINIA: Star City Model Expo, Exhibition Hall/Roanoke Civic Center, 10:00 a.m. – 3:00 p.m., giant swap shop and R/C airplane static show with awards. Sponsored by RVRC. 120 tables for rent, hobby shops on site, auction, raffles, door prizes and concessions. Dealers & hobby shops welcome. Adults—\$4.00; 12 & under—\$2.00; tables—\$12.00 in advance, \$16.00 at the door. Details, contact David Yeager @ (540) 427-4843 after 7:00 p.m., or email srstubs@nrv.net. Please come! [4/97]

APRIL 28: Elk Grove Village, IL. Chicagoland Radio Control Modeler's 16th Annual Auction & Swap Meet. Al Hattendorf Center, 225 E. Elk Grove Blvd. (corner of Ridge Bl.—1/2 mile east of Arlington Heights Rd.), Elk Grove Village, IL. 10:00 a.m. – 2:00 p.m. Vendor's setup 8:30 – 10:00 a.m. (\$10.00 per table). Doors open 10:00 a.m. Auction @ 12:00 Noon. General Admission \$3.00. Vendor's advance reservations accepted. Contact: Dave Crown: 9386 Landings Sq. #507, Des Plaines, IL 60016-5270; (847) 824-6392. [5/97]



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NEXT STEP IN VTOL?

IN 1994, *Model Airplane News*, the NASA Langley Research Center, NACA Alumni Association and Shapery Gyronautics Corporation organized the Slow-Flight Design Contest. One of the objectives of this contest was to design, build and fly a fixed-wing aircraft that had a wide flying-speed envelope. The winning design had to be capable of flying as slow and as fast as possible, all within the same flight. The contest sparked my imagination and that of my friend Richard Orobitz, and the Manta Project was born. With this design, we tried to maximize the flight speed envelope by hovering and later transitioning into forward flight. The model was able to hover for short periods of time, and a few easy transitions into forward flight were made before the aircraft was retired. Manta took first place in the design contest (see *Model Airplane News* "Editorial," February 1997).

The encouraging results obtained from Manta prompted me to work on Manta II—a new, improved design that would be able to hover for unlimited periods, transition into forward flight and continue to fly like any other model airplane.

I was faced with two basic problems involved in the design of VTOL aircraft: the selection of a configuration that provides the high-mass moments of inertia required for stability in hover flight and that facilitate the transition into forward flight, and the design of a suitable control system necessary for the hover flight.

A tail-sitter configuration was selected for the model. This configuration has the advantage of allowing full thrust from the powerplant to be used in both hover and forward flight while

eliminating the need for complicated and heavy engine-tilting mechanisms. A delta-wing platform was selected. Delta wings, depending on their aspect ratio, stall at angles of attack of between 30 and 40 degrees. For Manta II, this meant that lift would start to generate at 30 or 40 degrees; this would facilitate an early transition from hover into forward flight.

In hover flight, where aerodynamic

forces are not present, the only contributors to the aircraft's static and dynamic equilibrium are gravitational and inertial forces and moments. For this reason, the aircraft's moments of inertia about its axes play an important role in maintaining stability during hover flight. The engines constitute the heaviest part of any model airplane; therefore, their number and location have a great impact on the mass moments of inertia of any model.

Manta II was designed to be fitted with two in-line counter-rotating engines to eliminate the torque of the engines. Furthermore, the engines were

placed along the longitudinal axes of the aircraft, as far apart as possible from each other in an effort to maximize the mass moments of inertia. Designing a control system capable of controlling the aircraft in hover proved to be another challenge. In the absence of aerodynamic forces over the wing surfaces, the controlling surfaces necessary for hover flight would need to be placed directly behind the

propeller slipstream. The aft engine's propeller was fitted with a shroud, which provides a surface onto which the controlling vanes are mounted and improves their efficiency (lift per unit of area). In this way, an array of four orthogonal vanes providing 3-axis control was designed. During flight, two of the vanes will be mixed like elevons to provide pitch and roll control while the other two will deflect together to provide yaw control. To reduce the pilot's workload during hover, two dual-rate, single-axis gyroscopes will be connected to the pitch and yaw control servos. Once the aerodynamic forces over the wing and vertical surface have been restored during forward flight, the aircraft will be controlled using conventional elevons mounted on the wingtips coupled with the vanes. Due to its VTOL nature, Manta II lacks conventional landing gear; however, to make conventional landings possible and to protect the aft ducted-propeller combination, a pair of large ventral fins was incorporated in the design.

White Styrofoam and balsa are the primary materials being used to construct Manta II. The wing and vertical surfaces are being made using sandwich construction consisting of a white Styrofoam core and balsa sheeting. The aft engine shroud was made out of a carved, blue Styrofoam core covered with a lightweight, bi-directional, epoxy/glass layup. Construction is well under way, and I hope to have it in the air soon.

—Adrian Palamarchuk ✦

